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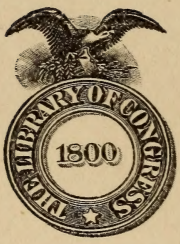
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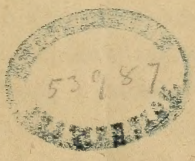
A WEEK AT PORT-ROYAL.

By
Richard Hill.

Nothing is so precious as leisure; not because one should do nothing, but because one may choose to do what one will.—SOCRATES.



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PREFACE.

Natura! quam te colimus inviti quoque.—SENECA.

Every natural object is an "altar of memorial" to Divine Wisdom, but how few bring the offerings to be laid upon it. ——— ——— The following memoranda claim no higher character than the jottings in Natural History, with which I amuse myself, when I can get away from my public duties for a time to enjoy rest and recreation. They were used as contributions to the pages of the *Cornwall Chronicle*, with a view of assisting the Editorial labours of the Proprietor of that Paper, at a time when he was suffering persecution as a journalist. They have been since printed in collected form in the expectation of rendering them in that shape more extensively beneficial to him, while they claim not to be devoid of interest to the Colonial public from the local information they contain.

RICHARD HILL.

A WEEK AT PORT ROYAL.

Saturday 21*st April*, 1855.—I have just visited Port Royal for a few days for sea air. My ailment, a degree of pneumonia, increases and diminishes so with changes of weather, that I am persuaded a decided sea-atmosphere will be an effectual alterative, and set up a new action in the system, and prove better to me than medicine.

Port Royal is a place for the memory. Her misfortunes have made her memorable. In the history of places reckoned among the great and famous of the Earth, she stands remembered as a terrible example. Like Tyre, she has had her princes of the sea taking up a lamentation for her. "How art thou destroyed that wast inhabited of sea-faring men —the renowned city,—which wast strong in the Sea, —whose inhabitants caused terror on all that haunted it:—how were the isles troubled at thy departure."—Ezek. ch. xxvi. Nothing can less be like Port Royal of the Earthquake than the miserable shadow of a shade, that bears the name, now.—"The city that trafficked in violence,"—lies ten fathom-deep, and the poor representative of it that has

been built on the succeeding accumulation from the ocean, has no sort of commercial importance.

The old city must have been wealthy,—for Kingston has risen on its ruins. In the wars of the French Revolution, when the neighbouring Colony of Saint Domingo was a great and rich dependence of the enemy,—its naval importance made it a place of business :—but never anything more than mere victualing business : the supply of vegetables to the shipping ; of pigs and poultry to the outward bound Vessels, and of turtle to the merchant princes of London. All this is now nearly gone. Peace has reduced the naval activity to the fitful visits of the Admiral to the station, and steam navigation has concentrated the bustle of comers and goers all in Kingston. The mercantile shipping no longer halt at Port Royal ; and the vegetable market, that made it worth while to distinguish the plantation at Passage Fort, that supplied it teeming with melons and cucumbers, as thick as the fields of Egypt, with the name of Pumpkin-ground, is still stocked with esculent roots and fruits, but for very little beyond the week's supplies to the impoverished dwellers in the remnant of the town now known as Port Royal.

There are two persons, humble, but not forgotten, though both dead, of whom I have been anxious to obtain some intelligence. The motherly lodging-house-keeper, the Couba of Nelson's correspondence, and Sarah Adams, the matron of the naval Hospital. Nelson, in writing to his friend Captain Lockyer, whom he calls his best of friends, and from whom so many of his early letters have been recovered, invariably sends remembrance from Couba of Port Royal,

referring to her as a person to whom gratitude was due for kindness and attention. After the disastrous expedition up the river San Juan de Nicaragua, when so many perished from the suffering of over-labour, and Nelson was saved from dysentery to achieve his great name, he was conveyed on shore in his cot, to Couba's, and thence to the Admiral's country residence in the mountains of St. Andrew's for change of air, and to be nursed under the eyes of Lady Parker. Tired as much of his do-nothing solitude, as of his slow recovery, he writes to Hercules Ross of Kingston, the Coryphœus of Navy Agents in those days, 1780,—to say, that where he was, a sick Lieutenant was as little thought of as a log of wood, and sensitive under the discomfort of his situation, he exclaims—"Oh, Mr Ross, what would I give to be at Couba's lodgings, in Port Royal." I find that Couba has not perished from the pubic memory. She was a kind-hearted negress, named Couba Cornwallis—had been the mistress of Admiral Cornwallis, when a young officer on this station, and in the fashion of those days, when the fortune that gave a woman a friend in these Colonies gave her also a family name,—the African Couba, became Couba Cornwallis. When prince William, was a midshipman under Lord Hood, a wild frolicksome sailor-boy,—as they remember him, Couba's care soothed many a headache;—her timely watchfulness checked many a fever of the Royal blood.—William, Duke of Clarence and King of England, seems to have narrated to his kind princely-hearted partner; now of sainted memory, as the good Queen Adelaide,—anecdotes of her kindness, for she sent

to Couba Cornwallis,—a present of a costly gown, —which the benevolent Couba, would not wear, but reserved for her burial. It was her shroud in the grave. Couba lived till the year 1848. Sarah Adams, was another kind-hearted negress, remembered with affection by the sailors. Her last offices were those of the matron of the Naval Hospital. I heard Sir Charles Adams, who was on this station, in 44 and 45,—say that nothing afforded him greater pleasure, when after some interval of forty years, coming here as Admiral, he found Sarah Adams, whom he had noticed with admiration when a midshipman fourteen years of age, as a remarkably handsome negress, endeared by a kind and gentle disposition to the officer-boys like himself,—in the distinguished situation of matron of the Hospital. It was pleasant, he said, to see such a recognition of sterling worth ; and such faithful discernment of merit, in those whose duty it was to select fit persons for confidential offices. Sarah Adams, in old age, was a singularly handsome woman. In what way the waters of life had proved troubled waters to her, I know not ; but she never took her marriage name, which was said to have been Mullins ; but stuck to the Sarah Adams that endeared her to the heart of those among whom she lived and died. Her death occurred in 1849.

Twelve years and some four months ago I spent a day in Port Royal. I was labouring under sickness after a heavy family affliction * * * * * * * * * * I was indifferent about most things that would have interested me. The scenes of the garrison-yard, were however irresistibly attractive.—

The cocoa-nut trees and cordias,—Asclepiases and hibiscuses, formed the lines and avenues that they do now, and the walks were already bordered with large cannon-balls, and soccotrine aloes, but a guazuti deer, or a llama, as some say, very likely both,—peccaries, and agoutis, sauntered through them, and monkies swung at the ends of the flouncing palm-branches, or leaped from tree to tree; and maccaws, big and brilliant in red and blue and blue and yellow flung their wings about among the green leaves; and cockatoos and parrots and parroquets, whistled and chattered away in the midst of foliage and flowers. The place was a perfect zoological garden. I found in cages against the wall, the margya, and, if I am not mistaken, a superlatively fine specimen of the felis tigrina pardalis, the parded ocelot. There were some Curacoa birds about.—There may perhaps have been a pelican on the beach, for this is a common citizen of Port Royal. There were the usual intermixture of running Muscovy ducks and poultry; and a carrion-vulture balancing its wings hither and thither, and a man-of-war-bird hovering, and a gull scudding: and a booby soaring, gave the whole scene an interest to be seen concentrated no where out of some pantomime of Harlequin Crusoe or Peter Wilkins.

I am informed that Colonel Rudyard and Dr. Williams of the artillery were the collectors of the living wonders that were at that time gathered together here, contrasting the quiet rationality of the brute world within the parade gardens, with the

unquiet irrationality of the human coteries outside the garrison. One would have thought that a taste of this sort once established, and so easily gratified by the aid of the cruisers on the station, would hardly ever have been abandoned. Fruit-eating birds, and fruit-eating beasts may be kept readily; but graminivorous animals, must starve at Port Royal; it grows no grass save in the little park where the salute and announcement guns are fired morning and evening. Every where else is grassless, whatever else it may grow? The tribulus gives its rich yellow blossoms to the running poultry, and the careering pigeons find pickings among the pea-pods of the crotalaria in the sands; but the sea birds, and the morass-hens would thrive, and herons and flamingoes might be kept as common here as they were about the Fort of Manzanilla in Cuba when I visited it some years ago. There were scarcely a cottage on the beach there that had not white egrets standing four feet high,—scarlet ibises, and red flamingoes, coming and going into the cottage yards, and there were those cursorial birds that keep the houses free from insects running in and out the rooms; and there too, I saw the capromys the utia of the Indians, penned up and fed in an enclosure shadowed by the palm and paletuvier with the mocking-bird singing in cages.

I have never seen a mocking-bird here at Port Royal, though a sweet song I heard Miss Stevens sing in some West Indian Melodrama at Covent Garden said—

"Pretty little mocking-bird, thy form I see,
Swinging to the breeze on the mangrove tree."

The mangroves have their own singing bird, and a splendid little bird it is, the sylvicola petechi, the Canary warbler; its five notes are as brilliant as its plumage. It trills a shrill repetition of them, with no variation; and jerks about familiarly among the blossoms of the gamboge mallows in the town. Beside the Canary warbler I have only seen of small birds a couple of flame-coloured ruticillas (setophaga ruticilla,) a very rich-tinted bird, whose plumage of intermingled black and orange, as I would say, if oranges were always as ruddy as they are in this and the succeeding month, when they are luscious ripe, whose rich fiery plumage, never fails to arrest attention. They are on their back migration from Equinoctial America to Canada. They always loiter in our sea-side thickets for some two or three weeks. These are all the small birds I have seen, save and except one loggerhead tyrant, tyrannus caudifasciatus. I would add, I have not observed a cat in Port Royal.

I have seen in Kingston several of our own, and several birds of the neighbouring continent so reconciled to a dependence on the bounty of man, that it might be mistaken for domestication if it was not, that breeding in captivity made no part of the experiment. No birds more readily submit to human dependence than the parrot tribe,—but no instance of a parrot breeding in this tame life, has been known yet. I have seen the noddy-tern megalopterus sto-

lidus, as familiar among the poultry of a house yard as the pigeons. The washings of the plates gave him generally a sufficiency of fish and flesh-food, but if he got only soaked bread, and broken yam and rice, he was quite reconciled to his feeding. I have myself kept the booby, sula fusca, for months, and as we have six different species, very unsatisfactorily made out by naturalists,—though the distinctions noticed by Brisson, are precisely correct, it would be worth some pains to get them together in a sea side menagerie. I have seen the palamadea,—the chauna-chavaria,—that the Indians of Carthagena rear among their geese and fowls, as a guard to the poultry-yard against vultures, living on grain and aquatic herbs, and housing among our hens and chickens. It is as large as a Turkey. I have seen the nycticorax, a submissive retainer. We have two species, —one the Americanus, distinguishable only from the Gardeni of Europe in size, and both breed in the mangrove lagoons about Port Royal. I have seen a flock of dendrocygna arborea and autumnalis kept; and the sultana, the gallinula martinicensis,—tame as the porphyrio of Sicily, to which it is allied both in splendour of colouring and character. In Martinique they take the young of the purple gallinule from the marshy savannas, and find that they tame easily, fed on rice, peas, and bread; and Buffon relates that the Sicilian porphyrios, which the Marquis de Nesle kept in his *volery*, showed such a ready disposition to domestication in the strictest sense of the word that, in the Spring of 1778, a pair constructed

a nest which they placed on a projecting wall, but the six eggs of the size of a demi-billiard, being placed under a common hen, because the mother did not seem assiduous in covering her charge,—failed under that foster parent. The Brazilian jabiru is a monster worth seeing. He has the size of a pony, and the appetite of six pelicans: but he is an awful burthen of a pet. I have seen him introduced here, standing at a kitchen door like a sentry,—but watchful there, only to bolt every thing the cook should leave within his reach. Useful birds might however be brought with facility into the island, now that intercourse by the railroad of the Isthmus makes a short shake-hand of the Pacific and the Atlantic. We might get the cereopsis or new Holland goose from Australia, and the bernicla sandviciensis or little diminutive goose of Hawaii. Both have been successfully bred in England.

In the old maps of what now forms the harbour of Kingston, Port Royal, anciently known as Port Cagua,* was one of a system of islands which the Spaniards united by a line of intervening stockades. Against these the currents and the winds heaped sand, and formed the continuous spit of land known as the palisades. One may stand facing the breeze, that is, the constant ocean wind, that blows here almost daily with refreshing force, and see how the sand shifted before it, swells into hillocks, or graduates into dunes. The elevation of the windward side

* The Indian name, written in the old journals Cagway.

of the palisades exceeds that of the leeward. The shore rises steep from the water on the one side, with the billows breaking in heavy surges, the foaming waters washing up the materials with a rapid rush. On the inward side, the ground shelves off into shoals, and lagoons arched over with the mangrove. The desert sands that intervene, are seen ridged into ripples by their shifts before the gusty sweep of the breezes. They do not cohere as ripple-marks made by water do, but change continually, heaping themselves up against every obstruction.

The *Cashaw-tree* that grows so vigorously in-land is unable to make head against the bluster of the sea-breeze. It springs up with no trunk in the face of the wind, but starts off low and bushy, and frequently shows that it has been damned up, and overwhelmed by currents of drifted sand.

There are some masses of cohering pebbles forming laminated fragments of conglomerate, lifted by the surges into the inclined position in which they lie on the beach. The surges wash over them, and the broken waters in their refluent course as the billows retire, cut them into pieces and patches, and channel them into deep and shallow lines.

Among the shingles on the shore, I find fine specimens of the close-grained stone, a supposed *lias* from which lithographic stones have been taken. The pebbles of the beach are porphyry and trap, and a few granites. Masses of gypsum occur, and some dark-tinted limestones.

The vegetation of the beach consists of asclepias gigantea: prosopis juliflora: capparis cynophallo-

phora : canavalia rosea : crotalaria verrucosa and retusa : aloë perfoliata : convolvulus pes-capræ.

Besides these, there are the planted cocoanut, cocos nucifera : hibiscus populneus : and Parkinsonia aculeata : teccomas and yuccas. The rhizophora mangle lines the lagoons inward, and some traces of the coccoloba uvifera, or the sea-side grape are seen about. In the gardens there are a few trees and shrubs remarkable for their flowers, that manage to struggle through the obstacles of sand and water : the cordia, the nerium, the plumieria, the poinciana, two or three acacias, the mikania, some of the solanacea, and the vinca. I wonder they do not add to them, the showy blossoms we find upon sea shores elsewhere. The amaryllis belladonna, and the pancratium maritimum will grow in sand, and the xylophillas will vegetate within the spray of the ocean. I find that the cassia obovata or Alexandrine senna occurs on the sands further to the eastward.

If the convolvulus pes-capræ was not one of the commonest of flowers, it would be reckoned one of the most beautiful of the convolvulaceæ. It is distinctively the sea-side blosom. Its natural place is the sandy shore, which it mats and covers with a network of stoloniferous stems, mantling with a rich and glossy garniture of green leaves, crimson blossoms—thick and luscious. The most unpromising of beaches is never without clots and patches of it. Even when our winter thickets are so brilliant with large delicate blue and purple ; white and crimson-

starred; roseate and lilac convolvuluses, the deep rich glow of the pes-capræ on the sands loses nothing of its interest by rivalry. Our hedge-rows are usually profuse in garlands of either the distinctive concolvulus or the ipomæa. It is the merit of the sea-beach-flower to have the beauty and richness of both. The most arid of the Port Royal sands are profuse with them.

The canavalia rosea burthens with its matting of trifoliate leaves the stunted acacias, and makes a convenient bower against sun and wind. Macfadyen names it the purple flowered sea-side bean, and sets down its habitat, as common on the sands of the shore;—*purple-flowered* is a better specific name than *rosea*. It is deeper-tinted than carmine, and looks rich when full of blossoms; blue-red and bunchy.

The crotalarias verrucosa and retusa, the rattlewort, must be uncommonly endurable plants, to thrive on these hot dry sands but there they grow throwing out their racemes of handsome blue and yellow flowers amid the desert rubble, like lupins in a summer garden. They greatly resemble the lupin. In the rush of the sea-breeze they may be heard *rattling* their herd inflated pods, wakening up the pretty pink moths that slumber through the day among their palmated leaves. I confess that a flower that will grow in such a place as this burning shore, would have to me a high recommendation, even if it had no beauty, but the crotalaria, is a very ornamental flower, only too common to attract notice. In a

situation like this in which not a blade of anything grows, it is noticeable. It is the kindred crotalaria *striata*, common in mountain roads, that, retaining the rain-drops long after showers, annoys the foot traveller so much as to have received the name of the *water-bush*. Is there anything peculiar in the leaves by which they resist the evaporating powers of sun-light, and thus become remarkable, the one for nursing its moisture to carry on vegetation in the burning desert, and the other, to pour out rain-drops where the climate is moist, and the vegetation riant and luscious ?

A plan of Port Royal, published some sixty years ago, represents the present condition of the spit of land on which the town stands, relatively with what remained after the great earthquake of 1692. It shews what was then sunk, together with the since gathered accumulations on the south side, and what in some degree replaces the land lost upon the North. A white buoy floats in seven fathoms water *at a considerable distance out*, in what is the road-stead. This buoy marks the situation, of *a sunken fort* at the most northerly point inward, within what is specially Port-royal Harbour. Along this, trending eastward, the sounding line strikes on the ancient wharfs and fortifications. The present star-shaped fortress, known as Fort Charles, which commanded a deep embayed hole called Chocolate Hole, in the midst of the shock that engulphed houses and embattled walls and wharfs far away to the North of it, remained a detached Island. A central patch of land to the north

east, in addition to Fort Charles, is all that remains of ancient Port Royal. It is very evident from the fact that the palisades are a chain of islands fortuitously united by accumulations from the daily surf, that the outward and inward ledges of rock which give the precipitous depth of water entering and rounding into port, if shaken out of place or rent, to say nothing of being thrown down and sunk—would be sufficient for the destruction that ensued. The centre rocks were shaken but not dislodged; the outer ones were moved out of place. All the interstitial land, slid away into the deep, and the inrolling sea, with the swell and surge that accompanies any shock of an earthquake, engulphed houses and inhabitants in the four to seven-fathom depth in which they lie buried. Fort Charles, that edged the sea north and south, now stands midway between wide borders of new land. Chocolate Hole, with some more of the old deep sea, is now the garrison parade. The outer edges of the spit, that is the palisades as they are at present, slip immediately into deep water. A large vessel, under sail to her anchorage, could throw a shilling ashore, and the best fishing-ground for sharks and bonitos, is the white buoy on the Fort-shoal, out away in the harbour to the north-west of the Hospital.

One can assign no determinate effect to the subteranean commotions of an earthquake. Sometimes the movement is by horizontal oscillations; sometimes upward and downward by perpendicular upliftings, as if an explosive force had suspended the action of gravitation, and this force terminates sen-

sibly by a settling down, first on one side, and then on another, that is by a swaying from the right hand to the left, and from the left to the right. It is now within a few days, thirteen years ago, since the city of Cape Haïtien was overturned, and from three to four thousand of its inhabitants buried under the fall of their houses. The whole of the north of St. Domingo was convulsed. Large fissures sent out sulphureous vapours, and bituminous waters. The Citadel of the Ferrier, cresting a mountain above the clouds, was half of it precipitated down the cliffs a couple of thousand feet into the vale below. In 1852 the city of St. Jago de Cuba was one third of it destroyed, and the earth continued to be rent and torn for weeks after; and we saw during these shocks, the river Cobre at Spanish Town, calm flowing of a sudden in its *upward* channel, while it increased its velocity in its *downward* channel to the sea.

The violence which the island suffered during the earthquake that destroyed Port Royal, is related with too much distinct circumstantiality to be rejected as an overcharged picture. The ground, we are told, swelled and heaved like a rolling sea ; the earth was traversed by numerous cracks two or three hundred of which were seen opening and then closing rapidly again. People were swallowed up in the rents : some the earth caught by the middle and squeezed to death ; and others after being engulphed were cast up again with quantities of water. The large store-houses on the harbour side subsided so as to be submerged from twenty-four to forty-eight feet; the mast heads of the vessels stood among the walls

of the houses. The land round about sunk to the amount of a thousand acres, in less than a minute. At the first shock, the sea rolled in, and converted the land into a swamp; and in the part of the town that remained standing one of the streets was found to have been doubled in width.

Admiral Sir Charles Hamilton related, that, in 1780, the submerged houses were plainly discernible between the town as it now stands and the usual anchorage of vessels of war. Bryan Edwards says, in 1793, the ruins were visible in clear weather from the boats which sailed over them; and Lieutenant B. Jeffrey of the Royal Navy, states, that when engaged in the surveys made between the years 1824 and 35, he repeatedly traced sites of buildings where the depth of the water is from four to six fathoms. When there was little wind, he perceived traces of houses, especially distinct when he used the instrument called "the diver's eye," let down below the ripple of the wave. The lake, which is said to have covered above a thousand acres, burying under sand and gravel every thing of vegetable life that existed on the surface, is evidently spoken of some still existing ponds in St. Thomas in the Vale; for, we are told that, between Spanish Town and sixteen mile walk, that is within the gorge of the Rio Cobre, at what is called the Bog-walks, (Bocaguas,) the high and perpendicular cliffs bounding the river fell in, stopped the waters and flooded the vale for nine days, the floods subsiding when the river had washed away the obstruction. The Blue Mountain and other high ranges of mountains are declared to have

been strangely torn and rent. The rivers from these mountains ceased to flow for twenty-four hours, and when the damned-up floods found a course to the sea they brought down thousand tons of timber, that floated about in the ocean, grouped like so many islands. So rapid and resistless had the trees rushed down in their course that they were in general barkless and branchless. It is particularly remarked in these narratives, as in that of so many earthquakes that dead fish were taken up in great numbers on the coast after the shocks. The correspondents of Sir Hans Sloane, who collected with care the accounts of eye-witnesses of the catastrophe, refer constantly to subsidences, as if there was a prevailing supposition that the whole island had sunk considerably.

Looking at Sir Charles Lyell's delineations of the fissures and chasms left after the earthquake of Calabria in 1783, we may explain many peculiarities, not so much of our mountain gullies and ravines as of the gullies that occur in our plains. They seem to commence in no confluent water-shed.—They cut their channels through the argillaceous strata, with vertical cliffs, and cannot be accounted for in the course they take by the declivity of the plain, or by the quantity of rain they drain from the surface. The early maps of Saint Catherine's show that there have occurred deviations in the course of the Rio Cobre, that are not easily to be reconciled by abundant rains. Antecedent to the discovery of the West Indies, the embouchure of the

river was perceptibly in the ponds, shut in by the narrow belt of land on which Fort Augusta stands, the river having been at that time more of a surface stream and striking to *the sea due South; the outlet curving Northward* and embaying passage Fort. At the time of the conquest of the island by the English, the river flowed in an opposite direction *due north,* coursing the foot of the Caymanas mountains, and making the present lagoons in the upper part of that plain its channel, seeking the *sea southward,* through what is now an independent stream, called the Ferry-river (Fresh river.) In 1722, in the midst of an extraordinary rain-storm, this channel was suddenly quitted, and a straight line made *Eastward* The settling waters as they reached the harbour of Kingston, impeded by the Easterly winds, regurgitated through the lakelet into which they gathered themselves, and digging out the soil at the foot of the mountains made the present lagoons, increasing the sea-bord lands of Hunt's Bay 3000 feet (three thousand.) The silt and sand that form the subsoil of Saint Catherine's plain abound with land shells of existing helices, at an elevation above the sea, which would imply some subsequent uprising of the Island, in which the channel of the river was deepened, and the present gully rents made. We may apply to these changes of the river, the facts that Sir Charles Lyell represents attendant on the great shock of February, 1783. Not far from Soriano in Sicily innumerable fissures traversed the river plain in all directions, and absorbed the water until the argilla-

ceous substratum became soaked, so that a great part of it was reduced to a fluid paste. Strange alterations in the outline of the ground were the consequence, as the soil to a great depth was moulded into any form. The rivers of the neighbouring hills were precipitated into the hollow, and the small river of Caridi was entirely concealed for many days: and when at length it reappeared; it had shaped for itself an entirely new channel (Sir Ch. Lyell's Principles of Geology, ch. xvi. book II.) The plain of Saint Catherine's in the occurrences of three hundred and fifty years present very similar facts to these incidents of the river plain of Soriano.

There are two palms, phœnix dactilifera, near the walls of Fort Charles. They are, apparently from their growth, of an age anterior to the earthquake. They are probably of a date co-eval with the settlement of the Spaniards. The numerous beautiful date-palms we see in Kingston and the plain of Liguanea are certainly Spanish.

No one who has observed a boiled fish upon the table can have passed unremarked, the spinal column, with its upward and downward processes, and the four transverse strips of flesh, adjusted alternately in different directions with strong semi-transparent tendons between. The spinous processes, proceeding from the vertebræ upward, support the dorsal fins, whilst the transverse processes downward with curved bones, encircle partially the bulk of the body.—Without being ribs these latter resemble ribs. Those

placed far forward represents the proper thoracic ribs of fishes, but have no direct connexion with the spine. There are other rib-like bones behind. These are abdominal appendages very numerous in some fishes, such as the herrings; and very few,—and those few conveniently large, in others such as the perches and labruses. They are wanting in several of the osseous tribes, such as the diodons, and tetraodons, and are altogether non-existent in the cartilaginous fishes. It is from the fact that so many of our fishes belong to the percoid and labroid families, that we are so seldom troubled with what are called by the cook bony fishes. We suffer verv little annoyance from bones in our fish-dishes.

One of the finest of the labroid fishes is the hog-fish, both for its flesh, thick, white and luscious, separating in large strata and its exemption from small abdominal bones. I shall describe it, as it is one of the commonest, and one of the best fishes, taken in Port Royal, either by the fish-pot, or the line, the only source for supplying the market in the deep waters there.

The *lachnolaimus suillus*, has the general characters of a true labrus. The villous membrane that covers part of the pharyngeals, and palate, gives it its scientific name, *woolly-throat.* "C'est de cette particularité que nons avons derivé leur nom generique lachnoleme, de *lachne* (lanugo) et de *laimos*, (guttur;) il signifie gorge laineuse, gorge veloute," observes Cuvier. Histoire Naturelle des Poissons, tome. xiii. liv. xvi. ch. vi.)

There are several lachnolemes, ordinarily in the market, but only one properly called the hog-fish, *suillus*. The most beautiful is the *aigula*, the aigrette of the windward islands. They are all sought after for the excellence of their flesh, "le bonteé de leur chair," but one the *caninus*, is occasionally poisonous A black spot is found at the base of the dorsal fin, on all the species save the caninus, and though red is the tint of all, this one is red with less variability of hue than in any of the species.

The hog-fish, suillus, has its scales red with yellow at the base of each. The head purple above; the two lower jaws a clear blue, on an orange with red ripplings. There is a greenish blending with the gray and red borderings of the second dorsal fin. The pectoral fins are yellow, and the ventral of the same colour, with red spottings. The caudal is half blackened with a yellow crossing. The iris of the eye is red. The fish feeds among rocks, attains three and four feet of length, though two feet and a half is usually the longest dimension with us. Its habitation among rocks, renders it a frequent prize of the fish-pots in the broken deep-sea ground of Port Royal. The long dorsal fins, the spines elongated into three filaments, flaunting out like whip thongs, and the prominent curved teeth with the lengthened points of the tail, and of the extremity of the second dorsal and anal fin, are very marked peculiarities of the lachnoleme, being adaptatious to its labyrinthian life among the rocks. The hog-fish, is broader and flatter than any other of the labroides, and has the fleshy lip protuberant, that has procured for these

hard spine-finned fish (*acanthopterygians*) their lip-name.* The flesh is most delicious, but its fullness and firmness, make it good for drying and smoking, when too large for one day's dish.

The macrurous decapods of the genus *Scyllarous* seem to me more common at Port Royal than elsewhere. The singular conformation of the external antennæ distinguish them; but their broad flat square shape, their eyes situate far away from the median line, near to the angle of the large square carapace, the abdomen thick, and nearly equal in all its rings, terminating in a great fan-shaped fin, with soft and flexible foliations, are particularly noticeable. Our Scyllarus is the equinoxialis. Dumpy as it seems, it is the longest of the three genera of Scyllarians, —Scyllarus, Thenus, and Ibacus.

In the midst of the difficulties that interpose at Port Royal to poultry keeping, why do not the people have recourse to pigeons? "Rocky and precipitous cliffs, particularly those of the sea coast, perforated by caverns, either originating in the nature of the rock itself, or worn and hallowed out

* Celui des *labres* reunit les especes á levres grandes, charnues et comme doubles. * * * * Tous ces poissons se nourissent de petits coquillages, d'oursins, de crustacés, dont ils peuvent facilement briser l'enveloppe dure et solide, par l'action de leurs pharyngiens fortement dentis. Ils vivent reunis, sans former des troupes nombreuses, sur les cotés rocheuses, á l'abri des mouvemens violens des vagues.—Cuv. & Valen. Hist. Nat. des poissons, tome xiii. livre xvi. ch. 1.

by the action of the waves, are the appropriate retreats of the pigeon in its wild or natural state." The range of the dove-cot species is very extensive, throughout all sea-bord countries. In the rocky islands of Africa and Asia and in those of the Mediterranean, it swarms in incredible numbers. The rock pigeon, columba livia, reconciled to the cavern that man makes for him in the dove-cot, is the denizen of our poultry yard. It comes into voluntary subjection to its master, who substitutes for it the artificial for the real cavern. At morning until evening, off and on, it leaves it to enjoy unrestrained activity in the spacious heaven, and returns from time to time as much dependent on his own exertions as on his Master's bounty for support. It was the maritime habit of the rock-pigeon that fitted it to be the Messenger, in the Deluge, from the Ark. *No arboreal dove* would have been adapted for the duty of watching the retiring waters. None of the terrestrial pigeons had wings for the excursion, or, if they had, would have had instinct to face the flood: but the rock pigeon seen in the Orkney islands, inhabiting the caves of the coast, and retiring deep into their retreats, beyond the nestling holes of the auks, gulls, and other aquatic fowls, familiar with the tidal incidents of a maritime shore would go forth to see if—"the waters were abated from off the face of the ground," and finding the straws and leaves lying high and dry, would do what we see them do in their nest-building time in our poultry yard, come in the evening with a leaf plucked in its mouth, as the first flooring mat for the expected

chick. It was this instinct that made it fit, when the winds of the flood had passed off, and the waters had assauged, and the fountains of the deep were stopped, and the rain from heaven was restrained, and the streams were returning to their beds, to career over destruction, and come back to the ark, the messenger of mercy to a perishing world.

In the Reverend Saul Dixon's amusing as well as instructive book "the Dove-cot and the Aviary," we have a collection of facts and anecdotes respecting pigeons that render it as fresh as a newspaper. There we find that the *Russia pigeon* of the Yarmouth breeders, is a bird that has gone the voyage from the Mediterranean to Archangel. "The Yarmouth sailors are very fond of buying pigeons in the Mediterranean ports, and they are great pets on board ship. They breed them in lockers and hen-coops, and they are sometimes allowed their liberty, and permitted to fly round about the vessel, while she is pursuing her course on a fine day." If we would have a thorough good account of the rock-pigeon in its maritime life and cavern home, take St. John's Tour in Sutherland. The blue rock-pigeons live in all the caves on the coast of Sutherland, and are to be seen flitting to and fro, from morning to night. "Although the wind had fallen," when the sportsmen went thither for a day's sport, "the swell was tremendous, dashing the spray half way up the rocks. "It was a curious sight," he says, "to see the rock-pigeons flying rapidly into the caves, sometimes dashing like lightning through the very spray of the breakers, scarcely topping the crests of the waves,

which roared and raged through the narrow caverns where these beautiful birds breed. The rock-pigeons were very numerous, and constantly flying between their wild but secure breeding places and the small fields about Durness. He shot a few of them, and found their crops full of green food, such as clover, the leaves of the oat, &c. A number of small shells were also in the crop of every bird." There was a fact for a sea-shore dove-cot. Take again an extract from Colonel Napier's amusing and spirited "*Wild Sports of Europe*," cited by Dixon. The scene is in the vicinity of the decayed palace of Marfa, at the western extremity of Malta. "On learning that our professed vocation was to wage war on the beasts of the earth, the fowls of the air, and fishes of the sea, the old pensioner, who was in charge of the place, and was known by the name of Sans Façon, expressed his regret that it was too early in the season for the tunny fishery, which he described as being well worth seeing, and which has been celebrated in history even from the times of the Phœnicians. He however proposed to accompany us on a sporting excursion, and promised to indicate the usual abodes of the blue pigeon, which in great numbers frequents all the precipitous cliffs forming the boundary of this rocky coast. We accordingly sailed out, and proceeding in a southerly direction towards the cliffs, went over ground such as in all my wanderings, I had never before witnessed. * * * * Leaving this scene of desolation, this wide bed of lava and volcanic deposit, we gradually ascended, as the abrupt and rocky shore now assumed a still bolder

appearance, and rose to stately cliffs, at whose foot broke the foaming surge with a dull and sullen sound, subdued and deadened to our ears, by the fearful height we had attained above the angry and boiling billows. This was the resort of our feathered foes, who started from their nests by the stones hurled over the perpendicular sides of the precipice by old Sans Façon, afforded us capital shots; but as all our victims found a watery grave, we were soon convinced that to secure the killed and wounded a boat would be necessary, in which to coast along under the cliffs; and it was now too late to think of such an accessory." (The Dove cot and the Aviary, page 158–9.

Nature has endowed the pigeon with instincts enough for every difficulty of living. Their natural disposition to range far and wide for subsistence,—their industry and labour in the enjoyment of independence, enable them to calculate their means, and to estimate them by their wants, and if they find the provision at home scanty, they seek supplies abroad. If they suffer inconvenience from the distance at which food is to be found, to make up for what is wanting at home, they abandon the distant habitation and affiliate themselves with some more accessible community. Their independence renders them always adaptive in their habits, and nobody need fear difficulties which the natural instincts of the bird are not sufficient to overcome.

"Pigeons are thirsty creatures: they like the neighbourhood of water, and seem heartily to enjoy the act of drinking." This seems to militate against

the fitness of a waterless place like Port Royal, for pigeon feeding. But a careful attention to the supply of fresh fluid, will be always an attraction homeward, in their farthest wanderings. Every body has observed, at least we think so, if they have been observers at all, that *pigeons drink as no other birds drink*. They plunge their heads into the fluid, nearly up to the eyes, and gulp it down by full draughts, not by sips like cocks and hens. They do not raise the head while quaffing, but draw in the water as cattle do at a horse pond. Under ordinary circumstances they pertinaciously stick to their old abode, and under an economy that supplies them with fresh water, where fresh water is not otherwise to be got they would prove the most patient of home-lovers, magnifying its comforts by the multitudinous privations they suffer away from its sweet small luxuries. It should not, however, be forgotten, that there are care and caution to be attended to, in selecting a location for a colony in which the life must partake more of the wild incidents than are actually the lot of the domesticated tenants of the dove-cot. The following passage from Varro, which Mr Dixon, gives and translates in his text, should never be lost sight of. "If ever you should establish a *dovery*, you should consider the birds your own although they were wild. For two sorts of pigeons are usually kept in a dovery; the one belonging to rural districts, and as others call it a rock-pigeon, which is kept in towers, and among the beams and rafters (columinibus) of a farm-house, and which is, on that account, named *columba*, since, from natural timidity,

it seeks the highest parts of the roof; whence it happens that the rustic pigeon sespecially seek for towers, to which they may at their own pleasure fly from the fields and return thither. The second kind of pigeons is more quiet; and contented with the food given it at home, it accustoms itself to feed within the limits of the gate. This kind is of a white colour principally, but the country sort is without white or variegated colours. From these two original stocks, a third mixed or mongrel kind is bred for the sake of the produce." (page 151.) The stay-at-home races should be avoided in hard feeding grounds, and the stock established should be some of those Mediterranean birds, which the Yarmouth sailors take with them in their Russian voyages.—They should be Russians with all the adhesive courage of Russians.

On looking at an ordinary osseous fish, there is a relation between the several fins, which we are sure to notice. It is that there are two of these organs that go in pairs, while all the others are single.—The pairs, the *pectoral* and *ventral* fins, represent the anterior and posterior organs of support and progression in the higher series of vertebrate animals, but the other accessory fins are additional appendages represented by no rudimentary members in higher structures.

The ventral fins, though not constant in all fishes, represent the hinder extremities of mammalia, as much as the pectoral represent the arms and hands. "The relative magnitude of the arms of fishes, and their constancy, compared with the posterior mem-

bers, corresponds with their great size in the embryo of higher classes, and their preceding the legs in their development from the trunk."—(Professor Grant's: Comp. Anat. ch. 1 sec. v. p. 65.)

The pectoral and ventral fins being limbs analogous to the extremities of quadrupeds, the other accessory appendages to the spinal column are interspinous processes, and are given to fishes for the purpose of directing and keeping steady the body. Their position does not render them powerful for more than inclining it from side to side, and preventing it from rolling round. Except in the radial expansion of the caudal vertebra usually spoken of as the tail, they are not directly employed in progression or turning.

"The fins which are in pairs are capable of four motions; namely, those of flexion and extension, and also those of expanding and closing the rays; for each of which motions appropriate muscles are provided: and, indeed, each ray is furnished with a distinct muscular apparatus for its separate motion; and these smaller muscles regulate with great nicety all the movements of the fins, expanding and closing them like a fan, according as their action is to be strengthened or relaxed. This feathering of the fin, as it may be called, takes place in most fishes, and is particularly observable in the tail of the esox, or pike tribe. Each ray of these fins, indeed, is furnished with a distinct muscular apparatus, for its separate motion." (*Anim. and Veget. Phys:* vol. 1 ch. vii. part 1 sec. 2.)

This extract from that part of Dr. Roget's Bridgewater Treatise, which treats of animal physiology, is a lucid statement of motion in the fins of fishes; but, as our object is not merely to direct attention to the motion of these organs, but to their analogy to the limbs of quadrupeds, and their difference of power and agency with their modifications to their several purposes, we therefore go on with a further extract describing their constructive adaptation for movement in their peculiar element:

"Whatever analogy may exist in the structure of the fins of fishes and the feet of quadrupeds, there is none in the manner in which they are instrumental in effecting progressive motion. The great agent by which the fish is impelled forwards is the tail: the fins, which correspond to the extremities of land animals, are useful chiefly for the purposes of turning, stopping, or inclining the body, and for retaining it in its proper position. The single fins, or those which are situated in a vertical plane, passing through the axis of the body (the mesial plane,) prevent the rolling of the body, while the fish darts forward in its course. The fins that are in pairs, (that is the pectoral and the ventral fins,) by their alternate flexions and extensions, act like oars; while they are capable at the same time of expanding and of closing the rays, like the opening and shutting of a fan, according as their action is required to be effective or the contrary. All these auxiliary instruments are chiefly serviceable in modifying the direction and adjusting the variations of force

derived from the impulse of the tail. They are employed, also, in suddenly checking or stopping the motion, and giving it a more rapid acceleration.—But still the tail is the most powerful of the instruments for progression, being at once a vigorous oar, an accurate rudder and a formidable weapon of offence."

This is a clear and brief description of the mechanical function of fishes' fins, but there is a comprehensive view of the skeleton of fishes, which I would take, as more determinate yet. I do not observe that physiologists have given very prominent attention to it, and I should not have been led to notice it in the large way in which I refer to it now, had not, the possession of two hippocampuses, or sea-horses, as they are called, remarkably fixed my attention, specially, to the structure and power of the *spinal column unaided or variously aided by fins.*

The spinal column is the essential instrument in the propulsion of fishes. It is the acting power regulating the accessory motion of the fins. In the several species lengthened out into the snake form, as in the eels and the cutlass-fish, the body is conducted entirely by the spine. The power of the posterior extremity is increased from side to side, by the bordering fin, adding to the skulling power of the column, but the essential instrument of motion is the flexibility of the column itself.

I think the best and simplest way of considering the organization of a fish, is by the relation of the spinal column and the accessory fins to modes of life

and locomotion. If we examine two such extremely dissimilar creatures as the eel and the sunfish, we see the peculiar caudal expansion dispensed with in both, and the dorsal and abdominal appendages united together as a continuous border. Now nothing can seem so little in relation, one to the other in structure as the two fishes here mentioned. The modification of the accessory fins is, however, the same, the difference is the elongation of the column into the serpentine length in the eel, and the contraction of it, into the dimensions and shape of an oblate spheroid in the sunfish; the usual skeleton mechanism that stands in the stead of the organs of progression and support, being reduced to mere rudiments. I shall advert to two or three other instances unlike the two preceding examples in which these accessory organs, are specially arranged and expanded to meet peculiarities in habit. The first I shall advert to, is the gymnetrus, a fish totally deprived of the anal fin. The dorsal fin is removed forward to the crown of the head, where it stands erect like a fan. The caudal is similarly expanded upward in an erect fan-like form at the upper angle of the tail vertebra, the intermediate space all along the back, being a continuous soft-rayed dorsal fin. (*Example Gymnetrus falx. Cuvier's Animal Kingdom: Fishes Griff. Ed. page* 209.) The next fish I refer to, is the pteracles, in which the dorsal and anal fins are of immense development, being each twice the breadth of the body of the fish, the tail, and pectoral fins preserving the ordinary dimensions. (*Example pteracles*

vilifer : Cuvier's Animal Kingdom, &c. p. 206.) I would notice some of the chætodons as those in which the dorsal and abdominal rays are not so much remarkable for their expansion, as for the angle at which they are set. They become by their horizontality so many susidiary aids to the tail alone, and I would refer to the platax Gaimardi, (*Cuvier's Animal Kingdom, &c. p.* 176.) as a remarkable illustration of this arrangement of what are ordinarily the vertical fins ; and I would point out again the loricaria cirrhosa as a fish in which the lobes of the tail are divided between a slender filament of prodigious length, and a five-rayed membrane, near the dorsal fin, seeming mere modifications of the tail. Here we see the column lengthened and shortened, and the accessory fins altered to adjust the necessary directive force, to the elongation and contraction ; and to the consequent habits of the fish. Here the alterations are made to suit the specialities of the spinal column.

In fishes, the head and body are in a line :—no neck and chest intervene. All that framed bulk in which are contained the lungs and heart of man, is thurst up into the circle in which we circumscribe the fish's head. There the blade bone, or scapula, broad and flat occurs sometimes attached to the spinal column, and sometimes to the cranial bones, or buried in the substance of the flesh about what would be the shoulder in the mammalian series of animals, without any other attachment to either the vertebra or the head. In this narrow space, however, the fish has a structure of a higher character than mammalians, inasmuch as it has a fuller developed structure

partially than the mammalian tribes. The bones that cross immediately behind the head, constituting arches, below and behind those formed by the lower jaw and lingual bones, are not alone bones that correspond to the *collar bone*, and *clavicle* of mammalia, but to those of the *merry-thought*, or *furcula* proper to birds. In this respect, if we classified by the doctrine that raises the animal to a higher series and degrades it to a lower, according as the bony structure is more or less developed, fishes would stand in a higher range of life than mammiferous animals, for in them there is no corracoid bone or furcula, or only the rudimentary traces of it in the corracoid process, while in the hoofed quadruped the clavicle or collar bone, is altogether wanting. So far it may be truly said, the fish-nature exhibits a higher development; but, we no sooner quit these bones to trace the *representative hand* in the pectoral fin than we find them as much behind in structure, as they seemed in advance, by the possession of the clavicle and the furcula. When we look for the *arm bone* or *humerus*, we find it quite rudimentary. The two bones of the fore-arm seem represented by no interposing bone. The shoulder-joint and elbow-joint are in general almost one and the same. "The two bones of the fore-arm, the *ulna* and *radius* are, in some few fishes only, so constructed as to roll with tolerable freedom on each other, exactly in the same way as they roll on each other in man, in the action of rotating the hand. It is by this means they have the power of changing the direction of the flat part of their pectoral fin, during its play in the water, a

power which is so conducive to the full use of this organ." (*Dr. Bushman on the Locomotion of Fishes*, Naturalists' Lib. vol. ii. *Ichthyology.*) Now these two bones, which are so important in their offices when they are found in any fish *so constructed as to rotate freely*, are firmly united together in most reptiles, in all birds, and in many quadrupeds: so that with the disadvantage of a less advanced development in the absence of the arm-bone, or in a shoulder-joint, and elbow-joint, one and the same, here certain fishes have the advantage of many of the superior tribes of animals.

To the ulna and radius when this adaptation exists in the way we have mentioned, are attached the several bones of the wrist, *quite corresponding to those of the wrist of man.* From these proceed the long radiating bones equally corresponding to those of the hand and fingers of man. These bones constituting the radial frame-work of the pectoral fin, are long and numerous. If increased dimensions, and additional numbers to the phalanges over and above the five-fold system of the human hand, give title to a higher organization—the fish among development-theorists would be a very exalted, as well as distinguished member of the vertebrata.

In the preceding remarks, I have endeavoured to shew the subordination of the several appendages and limbs to the proportions of the vertebral column. The changes they suffer to obliteration, when they are unnecessary auxiliaries to the spinal frame, is manifested in none of the fishes with such marked speciality as in the syngnathians, the pipe fishes, and

the hippocampuses, but the one is organised for flexibility and the other for very limited power of varying the horizontality of the column. I see nothing of aquatic life capable of being looked into, within the narrow space of a basin, more interesting than the pair of hippocampuses brought to me. They illustrate movement by the action of the vertebral column, almost to the exclusion of every accessory aid peculiar to fishes.

Fishes are the lowest of the vertebrata. We have seen, in the extract I have made from Professor Grant's comparative Anatomy, that they represent in the excessive development of the anterior limbs, the embryotic peculiarities of the quadruped. The superadded appendages to the vertebral column being employed in different animals for varied and distinct purposes, are many of them wanting in given orders and genera. We might expect that fishes, from their low position in the vertebrate series, would present some remarkable evidences of the deficiencies of the accessory composition, and the independent power of the central axis; and so they do.

The adaptation of the spinal column for flexibility without any versatile appendages will be most interestingly seen in the hippocampus or sea-horse.—There is a dorsal fin, but it is very subordinate in its functions: there is an anal fin, exceedingly rudimentary but found only in one sex, the female. There is besides all this sexual peculiarity in these fishes, which reverses the economy of gestation. The male have a pouch into which the female injects the ova. The eggs are fertilized by impregnation

in that marsupial sack, and brought forth by the paternal parent. The form of the hippocampus, and the flexible power of the vertebral column are special adaptations in the fish to this economy.

No one looking at the hard dry specimens of the hippocampus in the naturalists' cabinet would suppose *that* fish to be of a structure peculiarly tegumentary and yielding. Fishes in the integument enveloping them, secrete a solid material that takes the form of extravascular laminæ embedded in the living and vascular cutis ; that is, they are covered with scales. This is the *exoskeleton ;* the osseous frame work proper to the vertebrate body being the *endoskeleton.*

The spines of all fishes are indubitable derivations of the cuticular exoskeleton. Whether the spines be fixed by moveable articulations to the body, and raised or depressed by muscles inserted into their bones as in the mechanism of the vertical fins, or whether, they are mere points, enormously developed and serrated for wounding desperately, they indicate peculiar structures only of the external covering to the vascular and living skin to which their under surfaces are adherent. "The most usual form of the cuticular covering of fishes," remarks Professor Rymer Jones, with admirable descriptive brevity,— "is that of imbricated scales, with which the whole exterior of the body is compactly encased, as in a suit of armour. Such an investment is admirably adapted to their habits and economy. The dense and corneous texture of the scales, impermeable to water, defends their soft bodies from maceration

while from their smooth polished exterior and beautiful arrangement, they ensure the best possible resistance from the surrounding medium as the fish glides along." (*Animal Kingdom, ch. xxvi. section* 541.) Now in the syngnathidæ, in all which fishes, the sexual economy is so strangely ordered as I have said it is in the hippocampus, the whole body is covered with a strong armour, composed of broad dermal plates, moving in protuberant fibrous folds of the living cutis. This structure is the very reverse of that of the trunk-fishes, the ostracionidœ. There the integument becomes a strong box made of polygonal plates, set out like a tiled pavement, with no cuticular interstitial folds. The tail and the fins alone are moveable in trunk-fishes ; the rest is as *inflexible* as a steam-engine boiler. The *whole frame is moveable* in the hippocampus.

The female hippocampus, when the abdomen is enlarged with eggs, opens the male marsupial pouch, by means of the small anal fin of five rays, an appendage not existing in the male, and transfers from herself to the being to become the father, the ova for fecundation. Now to accomplish the parental office in this reversal of reproduction, by which the female becomes the intromittant sex, and the male, we may say the child-bearing, parent the power of intertwining with each other is assigned to the fish-structure, and the highest degree of flexibility is given to the spinal column. I know few objects more calculated to excite interest in a fugitive observer of nature, or to occupy more pleasureably the attention of a sea-side invalid confined

to his chamber than a few hippocampuses in a basin of sea water. Their graceful horse-like forms, their active movements, their vigorous flexibility, their constant tendency to caress each other by folding themselves on one another, and twining together, are actions so unlike those that charaterize fishes, that they are at once novel and amusing pets. The most graphic description I have met with in my reading of the habits of these fishes is contained in a communication of Mr Lukis of Guernsey; it will be found in the second volume of Yarrel's British Fishes, at Lophobranchii: Syngnathidæ, describing the short-nosed hippocampus—hippocampus brevirostris. When he wrote, a pair had been living twelve days in a glass-vessel— "an appearance of search for a resting place induced me," he says, "to consult their wishes by placing sea-weed and straws in the vessel:—the desired effect was obtained, and has afforded me much to reflect upon in their habits. They now exhibit many of their peculiarities, and few subjects of the deep have displayed, in prison more sport or more intelligence. When swimming about they maintain a vertical position, but the tail is ready to grasp whatever meets it in the water, quickly entwines in any direction round the weeds, and when fixed, the animal intently watches the surrounding objects, and darts at its prey with great dexterity. When both approach each other, they often twist their tails together, and struggle to separate, or attach themselves to the weeds; this is done by the under part of their cheek or chin, which is also used for raising

the body when a new spot is wanted for the tail to entwine afresh. The eyes move independently of each other, as in the chameleon : this, with the brilliant changeable irredescence about the head, and its blue bands, forcibly remind the observer of that animal" (Yarrel's Fishes, vol. ii. page 454.) All this diversity of bodily accommodation the hippocampuses effect by the flexibility and pliancy of the vertebral column, the fins being partly obliterated and partly rudimentary, and the tail without any radial termination. It seems to have a sensitive power of adaptation that reminds one of the prehensile tail of the Ateles monkey.

A person's attention is sure to be arrested by the sea horse's eyes. They are low in the head ; but their golden twinkle, the iris being resplendent yellow, and their place in the midst of what seems a horse's head in harness will be remarked ; otherwise amid their sameness of hue, their umber coloured lines and depressions, they would hardly excite notice. On looking at both eyes attentively as they twinkle their independent movement will be visible.

Our hippocampuses have not the brilliancy of the European species. They have no variable tint ; no blue dispersed over the head, body, or tail—our specimens are longirostris, if such a distinctive name is acknowledged by naturalists. I do not otherwise know our species.

Every body recollects the story of the middies, the new-comer, and the old stager, and the pleasant absurdity about the Port Royal goats, and the imitation bundle of grass. The goats are not

permitted to go at large. They are all tethered and fed: and they are as unacquainted with grass as Smollett's sage, whose antipathy to the country made him faint when he saw a cauliflower. That worthy's little familiarity with grain compelled him, in the face of a whole company to confess a plate of hominy to be the best rice-pudding he had ever ate. He however affected this delicacy to hide the fact that he was the son of a cottager, was born under a hedge, and had many years run wild among asses on a common. Our Port Royal goats really know nothing of green-fields, but by the patches of verdure they see on the far-off mountains. When you wonder by what means they acquire flesh, and make milk for the household, precious at just a penny-half penny for a thimbleful, you will discover that they are fed on all sorts of vegetable odds and ends. A tin-pan of tamarind husks, affords them little bits of mumbling, like Shakespeare's remainder biscuit after a voyage. The story goes that two middies going along, drew up at a knot of sleek-looking goats in the street. Bless me, exclaimed the newcomer, how do these animals live; there is not a blade of grass to be seen in Port Royal. Oh, says the old stager, I'll tell you how it is; they put on them a pair of green spectacles, and set before them a bundle of shavings from the Dock-yard, and it passes with them for grass. This is simply a pleasant absurdity, but Pennant refers us to a fact on the authority I think of Nicholas Hasselgreen in the Amœnitates Academicæ, which sounds not less

incredible. "The capra-hircus, in the vast diversity of regions to which it has been accommodated by naturalization, is found in Europe as high as Wardhuys in Norway, where they breed and run out the whole year, having in winter only the shelter of hovels. In that season they feed on moss and the bark of fir trees and *even on the logs cut for fuel.*" In the same work from which we get this extract we are informed that the Scythian antelope, the suhah, the saiga of Buffon, an allied animal to the goat, inhabits the dreary open deserts about the Caspian Sea, where salt springs abound. They feed on the salt, and acrid and aromatic plants of the country, and grow in summer time very fat. In the spring they divide in flocks, and return northward at the same time as the wandering Tartars change their quarters. On the shores opposite Port Royal, two classes of goats may be seen: those of the salinas, and those of the crags. Those of the salinas lead as hard a life as the Caspian saiga. They wander daily to the salt grounds, in several flocks, and subsist on acrid herbs. Those of the Healthshire, crags and cliffs, are absolutely wild, confining themselves to the crests of the hills, and enjoying a precarious existence among wild pintadoes, quails, and iguanas. Sometimes the sportsman who goes after them, starts the peafowl, become a maroon bird, in the same wilderness of thickets; and there he hears that sweet singer, the musteline thrush, confined to these hills and the neighbouring savannas. No animal seems more prone to varieties than the goat

save and except the dog. "Capræ tamen in plurimas similitudines transfigurantur," is the observation of Pliny. "Sunt capræ, sunt rapicapæ, sed illa Alpes, hæc transmarini situs mittunt." (*Naturalis Historia, lib. viii. ch. liii.*)

The annual egg-gathering visit, which the boatmen of Port Royal make to the Pedro keys, we may set down as a remnant of Indian life. In the work entitled "the discovery of America, by Christopher Columbus, compiled from his papers by his son Don Ferdinand," we are informed that on the 13th of November 1492, the Discovery squadron weighing from the Rio de Mares, Cuba, stood to the eastward, to search for the island called Bohio by the Indians, and coming to an anchor among some high-raised islets on the coast, found them to be places visited by the Indians at certain seasons of the year, for supplies of fish and birds. "The islands," Columbus says, "were not inhabited, but there were seen the remains of many fires which had been made by the fishermen; for it afterwards appeared that the people were in use to go over in great numbers in their canoes to these islands, and to a great number of other uninhabited islets in these seas, to live upon fish, which they catch in great abundance, and upon birds and crabs, and other things which they find on the land. The Indians follow this employment of fishing and bird catching according to the seasons, sometimes in one island, sometimes in another as a person changes his diet, when weary of

living on one kind of food." (*Part ii. Book ii. ch.* 1. *sec.* 5.)

From the light house on the Port Royal palisades to Portland in Vere, a line encloses a system of coast islands, reefs, banks, and shoals colonized by numerous birds, and fishes. Each kind has its own locality. Pelican key and Pigeon island never interchange inhabitants, and the bank that gives the king fish, gives neither the snapper nor the grouper. Southward from Portland, at a distance of some few leagues, the great Pedro bank is reached stretching near a hundred miles. There are islets at each extremity, but the group that attracts the egg-gatherers every year, are the keys distinguished as the Pedros at its eastern end. We shall loiter a little to describe a living world there that must have been a great attraction to the aboriginal Indians, in those periodical junketings that came under the notice of Columbus.

The Port Royal boats bound for the egg-harvest, bring to at the outermost of the Portland keys, and start at midnight from there, to gain with a favourable breeze in 14 or 15 hours the shelter of the Pedros, and to be snug at anchor long before sundown. The vessels in their voyage steer for a single rock in fathomless water, the Isla Sola of the Spanish maps. It rises about 30 or 40 feet out of the sea like a castle in ruins, over which the surf breaks fiercely; and in about five or six hours after making it, they anchor within what are properly called the keys.

There are numerous outlying rocks just above and

beneath the water, between the Pedro shoal and the open sea; on these the winds and the currents drive a heavy surf. The spots properly called the islands are seven in number, and vary from forty to some three and four acres in size. They are upthrown masses of broken coral and shell cemented by calcareous sand, washed upon rocky ledges above the sea. The breakers shift with the shifting winds, rolling these fragmentary deposits on before them. By the regularity of their change of action, they have done the work of accumulation pretty equally on all sides: they have raised a wall all around the islands, and left the centres hollow.

From time to time storms of unusual violence have carried the heaped-up coral and sand suddenly, and in thick layers, over portions of the islands where the dung of the sea birds had accumulated for years, and these irruptions have made intermediate deposits of animal matter and cemented rock. It is evident from the prevalence of this succession of deposits within the hollow centres of the islets that the sea has washed in the fragmentary materials of the outer margins, by a more than ordinary rise of the waters, and laid them in pretty equal strata at distant intervals of time, so that the centres have risen in height as the sea walls have been built and cemented up. The animal deposits which may be characterized as loosely cohering urate of lime are sometimes found two feet beneath the strata of cemented coral and shells, and run about an inch or an inch and a half thick.

Immediately within the islands, the water shoals,

and makes a bank called the Vibora by the Spaniards; it runs to the Cascabel rock, ninety odd miles westward, bristled with reefs and sunken rocks having a depth of from 7 to 17 fathoms. Easterly winds, that is the trade winds, veering southward and northward, for determinate portions of the year, roll constant billows over it. Westerly breezes, varying northerly and southerly, bring tremendous gales and heavy swells. The rough agency of all these movements has heaped up the sands and the corals, and shells, cementing them into rock and giving the island an elevation of from 15 to 20 feet.

The vegetation on these islands is stunted surianas, among whose tough and twisted branches the birds find nestling places. To these lonely islets resort thousands and tens of thousands of sea-fowl. As soon as visitors land, myriad of birds are upon the wing in all directions. Some flocks rise in circling flight high up into the air, and descending again in the same dense numbers as they rose, settle in more remote places; others break away hurriedly, and fly in a wide sweep far around, but return again hastily to the rocks they had quitted, reconciled to bear with the disturbance. The turmoil and hubbub of the thousands of birds thus suddenly put upon the wing, overpower for a moment the roar of the breakers, and darken the air like the sudden passing of a cloud.

The constant inhabitants of the rocks are several species of the booby gannets, terns, gulls, and petrel —and the frigate pelican. The frigate birds preserve their predeliction for rapine amid the teeming

plenty of the waters, and subsist by pillaging the gulls and gannets. The migratory visitors are ducks, herons, plovers, snipes, sand-pipers, curlews, and ibises, with the several falcons that follow them. In the autumnal movement of these birds towards the equatorial regions, they would be found steering from north to south, but at the time when the egg-gatherers visit the islets, they are seen coming from the south, just resting and departing north. The successive months of March, April, and May, are those of the egg harvest.

The Keys are open to all adventurers, but the egg-gathering is regulated by a custom which recognises the first coming vessels as commanding for the the season. The second vessel in seniority is called the commodore, the first being styled the admiral. They have a code of laws, to which, in a spirit of honourable compliance all are expected to shew obedience, and in case of any infraction of the obligations thus voluntarily imposed upon themselves, a jury selected from the several vessels try complaints, and, with due formality, inflict punishment for offences.

The south-west is the principal of the Pedro keys. The stay of the birds that resort there to breed is prolonged by the successive loss of the eggs they lay. Each loss is a stimulus to a fresh act of pairing; a new lot of eggs being the results, possibly in number equal to the former lot, but probably less, as the latter deposits are a forced production at the expense of the vigour of the bird, without any additional strength to the constitution by the

increased nourishment of food, the process by which domesticated birds in changing their habits are led to lay a continuance of eggs for a long season.—The egg-gatherers are careful observers of the progress of incubation and take only the eggs they know to be fresh laid. These are a part of the regulations they require to be observed, or the constant depredations committed on the birds would fatally thin their numbers.

Without going into the discussion of naturalists, who see in the different colours of eggs a certain relation to circumstances favourable to concealment, it may be observed that the blotched egg, laid by the hydrochelidon fuliginosa, properly distinguished as the *egg-bird*, is found among sticks and dried leaves of the suriana, whilst the white eggs of the boobies and petrels, are deposited in hollows of the coral rocks amid sand and chalky dung There is one curious coincidence between the eggs of the noddy, megalopterus stolidus, and the peculiarities of the nest that must not however be unremarked. The elaborate pile of sticks slightly hollowed, in which they deposit their eggs, is always embellished with broken sea-shells, speckled and spotted like the eggs. Audobon records the same occurrence in the nests of the noddy-terns he inspected in the Florida Keys. The obvious suggestion for this curious prevalence of instinct is deceptiveness, arising from similarity between the egg-shell and the sea shell. The nests are pillaged by what is called the laughing-gull, the xema atricilla, not the ridibundus; the numerous empty shells lying

among the rocks being always set down to the predatory visits of the laughing gull.

South-West Key and the other sandy islets around it, are beside, annually resorted to by the fishermen in the turtling season for a different harvest of eggs. The turtle, chelone midas, visits these shoals to deposit their eggs in the dry sand and leave them to the fostering influence of the sun. They repeat their layings thrice, at the interval of two or three weeks, laying a hundred at a time. Some experience is necessary to trace the place of deposit, for the eggs are always laid in the night; but few of them escape the detection of the turtler.

There is no fresh water on any of these keys.—They are surrounded by extensive reefs. There is tolerable anchorage for small craft in the south-east group upon a sandy bottom, broken by occasional rocks, on the lee side, when the usual eastern trade wind is blowing. From any other quarter they are unapproachable. It is not merely danger but destruction, to be surprised by westerly breezes, when among them. The hazard of gaining the shore amid swell and surf, except on the lee-side, with the ordinary sea breeze will be seen by a description of Seal Key.

Some three miles out to leeward of the south-west key lies Seal Key. It may be about three acres in extent. Its height is twenty feet. There is no approach to this islet, except in very fine weather, on account of what the seamen call "broken ground," sunken reefs on which the surf breaks with fury. At the best of times, landing is not effected without

peril : a continual sea rushes up the shore. Opportunity is watched to put the canoe on the top of a surge undulating into the landing place. The canoe drives into the shelve on the breaking billow, and when aground an active and strong person leaps out and retains it, and not alone prevents it from receding with the retiring wave, but drags it up, and keeps it from being filled with the succeeding surge. There is no vegetation on this key. The booby-birds repair there, but do not breed there. It is the congregating place of the seals alone.

The natural difficulty attendant upon all access to Seal Key, sufficiently accounts for the meagre information about seals which prevails among the host of egg-gatherers who annually resort to these islands and shoals. Address in landing must be combined with hardihood and perseverance, for frequently before a footing can be gained, the seals, the objects of attraction, have escaped to the waters, and continue to avoid the shore as long as intruders remain upon the island. A party who landed there on a visit made in 1846, surprized some five seals ashore.—They succeeded in immediately heading a bull (the epithet by which the male seal is distinguished)—both big and burly, and killed him. He proved to be an aged patriarch, with teeth nearly worn to the stumps, and a hide gashed and scared with scars, got in many a fierce fight, and about ten feet in length.

In the scramble which the seal makes to regain the water, nothing is to be remarked, but the violence and impatience with which he jerks his body forward, but when he plunges from the shore into

the sea, it is no small treat to see the suddenness with which the uncouth animal, so unwieldy and helpless on land, becomes gracefully alert in the ocean. The command with which he strikes through the water, the velocity with which he cleaves the flood, the ease with which he winds the mazes of the rocks, and dashes forward into the hidden recesses of the deep are beautifully interesting in a creature looking so essentially quadruped. When the boat is afloat again the seals come trooping out of their caverns to reconnoitre. At about a depth of three feet they paddle about, gazing up through the clear liquid with an expression of countenance beaming with curiosity and intelligence. They dodge around the boat, occasionally ascending to the surface to renew their inspirations of air, and to look, upon their island-home, to ascertain whether they may return there and be at rest. A grown-up cub about four feet long had been taken by the people; one seal was observed more persevering in her watchfulness and assiduity to regain the shore than the rest; this was conjectured to be the dam of the slaughtered young one. The maternal instinct did not exhibit any stronger emotion than this anxious vigilance; the young one was sufficiently grown to be no longer dependent on the mother. Had it been still sucking, there was enough to shew that the parental passion would have merged fearlessness into fury, and inquietude for the safety of its young into unsparing vengeance for its fate.

Without doing more than referring to Weddell's observation that the jaw of the seal he describes was

so powerful in the agonies of death as to grind stones into powder, it seemed from the condition of the teeth of some eight that were taken during the visit of the party I have been referring to, that their strength is exercised in more laborious work than crushing the bones of fishes. The opinion the more experienced fishermen expressed, was that they fed as much on moluscous animals as on fish, and that their teeth suffered much wear and tear in the work of breaking shells. Yet it is remarkable that the contents of the stomach of those killed gave them no insight into the nature of their food ; they were invariably empty.

I must not omit to mention, that the friends whose visit to the Pedros I here relate, had an opportunity of, closely observing the progression of the seal when ascending the beach. The advance was by a succession of zig-zag movements. It was evident that the ground was first gripped by one fore-flipper, then by the other, and that the body advanced first to the right then to the left, as one or the other flipper took its hold of the earth and helped the body onward. They seemed to delight in basking in the sun, and to huddle together and grunt out their pleasure in each others' company.

When Humboldt made his first passage across the bank of the Vibora, that in these Pedro Shoals, in the month of December 1800, he observed a number of curious meteorological phenomena, all portending the adverse weather which exposed him to danger and lengthened his passage to the Havanna to some 14 days. He thus relates his observa-

tions:—On the night of the 2d December a curious optical phenomenon presented itself. The full moon was very high. At 45 minutes before its passage over the meridian, a great arch suddenly appeared, of prismatic colour, but gloomy. It was higher than the moon and of a breadth of nearly two degrees. It remained stationary for several minutes; after which it gradually descended and sunk below the horizon. The sailors were filled with astonishment at the moving arch, which they supposed to announce wind. Bonpland and several passengers saw besides, at the distance of a quarter of a mile, a small flame, which ran on the surface of the sea towards the south-west and illuminated the atmosphere. On the 4th and 6th they encountered rough weather, with heavy rain, accompanied by thunder, and were in considerable peril on the bank. On the 19th they reached Havanna after a boisterous passage.

The retinues with which the Indians sallied out to the Islands, for their annual fish-feastings and barbecoes as they were called, may be conceived from that very picturesque account which Columbus gave of a cacique whose principality was Cabrita, and the neighbouring isles, narrated by the cura de los palacios. On the 22d July 1494, the discovery ships stood across from Cuba, to complete the circumnavigation of the island of Jamaica. On the Southern coast, the variable winds and evening showers obliged them to anchor under the land for the night, and proceed in their course in the morning.

Columbus, amidst the verdure that met his eye, was particularly pleased with a great bay, containing seven islands, surrounded by numerous villages. Anchoring here in the evening, he was visited by the cacique who resided in the largest and most elevated of the islands. He came with numerous retainers bearing refreshments, and loitered till night, listening enraptured at the stories of the splendour and glory of the land from which the strangers came. For the incidents which followed this visit, we shall draw at length from the charming text of Washington Irving in his narrative of the life and voyages of Columbus. "The next morning the ships were under way and standing along the coast with a light wind, and easy sail, when they beheld three canoes issuing from among the islands of the bay. They approached in regular order; one which was very large, and handsomely carved and painted was in the centre, a little in advance of the two others, which appeared to attend and guard it. In this was seated the cacique and his family, consisting of his wife, two daughters, two sons, and five brothers. One of the daughters was eighteen years of age, beautiful in form and countenance; her sister was somewhat younger; both were naked, according to the custom of these islands, but were of modest demeanor. In the prow of the canoe stood the standard bearer of the cacique, clad in a mantle of variegated feathers, with a tuft of gay plumes on his head, and bearing in his hand a fluttering white banner. Two Indians with caps or

helmets of feathers of uniform shape and colour, and their faces painted in a similar manner, beat upon tabors: two others, with hats curiously wrought of green feathers, held trumpets of a fine black wood, ingeniously carved: there were six others, in large hats of white feathers, who appeared to be guards to the cacique.

"Having arrived along-side of the Admiral's ship, the cacique entered on board with all his train. He appeared in full regalia. Around his head was a band of small stones of various colours, but principally green, symmetrically arranged, with large white stones at intervals, and connected in front by a large jewel of gold. Two plates of gold were suspended to his ears by rings of very small green stones. To a necklace of white beads, of a kind deemed precious by them, was suspended a large plate, in the form of a *fleur de lys*, of guanin, an inferior species of gold; and a girdle of variegated stones, similar to those round his head, completed his regal decorations. His wife was adorned in a similar manner, having also a very small apron of cotton, and bands of the same round her arms and legs. The daughters were without ornaments, excepting the eldest and handsomest, who had a girdle of small stones, from which was suspended a tablet, the size of an ivy leaf, composed of various-coloured stones, embroidered on a net work of cotton.

"When the cacique entered on board the ship, he distributed presents of the productions of his island among the officers and men. The admiral was

at this time in his cabin, engaged in his morning devotions. When he appeared on deck, the chieftain hastened to meet him with an animated countenance. "My friend," said he, 'I have determined to leave my country and to accompany thee.—I have heard from these Indians who are with thee, of the irresistable power of thy sovereigns, and of the many nations thou hast subdued in their name. Whoever refuses obedience to thee is sure to suffer. Thou hast destroyed the canoes and dwellings of the Carribs, slaying their warriors, and carrying into captivity their wives and children—all the islands are in dread of thee; for who can withstand thee, now that thou knowest the secrets of the land, and the weakness of the people. Rather, therefore, than thou shouldest take away my dominions, I will embark all my household in thy ships, and will go to do homage to thy king and queen, and to behold their country, of which thy Indians relate such wonders!—When this speech was explained to Columbus, and he beheld the wife, the sons and daughters of the cacique and thought upon the snares to which their ignorance and simplicity would be exposed, he was touched with compassion, and determined not to take them from their native land. He replied to the cacique, therefore, that he received him under his protection as a vassal of his sovereigns, but having many lands yet to visit before he returned to his country, he would at some future time fulfil his desire. Then taking leave with many expressions of amity, the cacique with his wife and daughter, and all his

retinue re-embarked in the canoes, returning reluctantly to their island, and the ships continued on their course," (B. vii. ch. vi.)

The island of Cabrita in Old Harbour Bay, on which this cacique dwelt as we are told in a large village, is the Goat island of our maps. It was from here that the first seeds of the Sea Island cotton were obtained for the plantations in Georgia. It is now without a hut or an inhabitant. The fisherman's canoe seldom visits it. It is the haunt of the bittren and the curlew. The crek of the mangrove hen may be heard as it traverses the marshes, but scarce any other voice. The goats that gave its name of Cabrita, have been long ago exterminated. The manatee frequently found in the fresh-water swamps of the opposite coasts, occasionally swims to it to browze the shallows, covered with the green and glossy blades of the Zostera, or sea grass. The rich argosies of Spain, laden with the ingots of the mines, rendez-voused here under the shelter of its heights in what is still called Galleon-harbour, but hardly any coasts of the island, presents less of life than the principality of this feathered chieftain. The seven islets have their respective bird tenantry still, and the shoals teem with fishes. Pelican key, possesses its peculiar nestlers, and pigeon island, is the resort of multitudinous flocks of the bald-pate dove, a pigeon that partakes so much of the rock-dove character as to flock to this remote island to build. They find there a sufficiency of arboreal foliage, and permit only an occasional white egret, to make a lodging

among them. It has happened that the cachelot whale has been seen tumbling and spouting in these waters. The numerous villages of the coast mentioned by Columbus have disappeared, and this narrative of the Lord of the isles, with its decorated pageantry is the first and last picture we have of Indian life upon these shores.

The garrison net at Port Royal is 150 yards long. The water is too deep for the seine any where nearer than the opposite shores of Green-bay and the Healthshire inlet by the Great Salt Pond, and in the ponds and lagoons about. The artillery soldiers make a boat's crew and haul it on those shoal grounds. In the several seasons it gives a prodigious diversity of fishes; some of the most curious are malthæas and torpedos—called here tremblers, from *tremola* the Mediterranean name for the torpedo. There are large supplies of mullets to be obtained by nets of this description from the Fort Augusta ponds.

The gulls and terns; and boobies and noddies; are few at this time. They are engaged in the labours of the Nursery on the Pedro-keys. In July and August, after their broods are full-fledged, they come hither, and forming flocks of several hundred, feed daily in the Salina ponds at Passage Fort, retiring in similar flocks to roost in the mangroves outward at sun-down.

The osprey, pandion haliætus, fishes in the waters at the mouth of the Rio-Cobre, and hovers after the nets at Port-Henderson.

The pelicans are seen of an evening retiring to their roost in the outer islets in pairs.

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In every family of animals there is a prevailing character peculiar and definite, which is always predominant, whatever may be the differences of the several species which that family includes. Thus among birds, in the falconidæ we perceive the essential trait to be the raptorial power of the talons, the *special* differences being an accommodation of the body to restricted habits and pursuits ; in the gallinaceæ, the rasorial quality of the foot and its adaptation for defence; in the ardeadæ the javelin properties of the bill for spearing the fish ; and in the anatidæ the sensitive power of the mandible formed in the shape of a spoon to enable the several individuals of the duck tribe, to examine and scoop up and search the waters for infusoriæ and other animalculæ. The Pelicanidæ considered in this way exhibit as a predominant character a structure in the greatest possible degree adapted for changing the specific gravity of the body so as to accommodate it to sudden and instantaneous transitions from heaviness, when rapidly descending upon a prey, to extreme buoyancy when pursuing it, added to a facility of lessening its specfic gravity, when burthened with a load of provender.

In the pelicans, the lower jaw affords suspension to a capacious pouch in which the bird bears away a considerable weight of fish, but the corresponding sack about the neck and throat of the tachypetes, or frigate bird is simply a large reservoir for air, to

increase the buoyancy of the body in flight, and to give direction to the beak upward and downward by lessening or increasing the gravity of the regions of the head. A prodigiously dilatable æsophagus to compensate the want of a pouch for collecting and storing food, occurs in the cormorant, phalacrocorax carbo, another very marked individual of the family of pelicans, and reputed among the most voracious of birds. The lower mandible is slender, elastic, and dilatable, and comparatively weak, but additional pairs of muscles, having been furnished them, the structure of the bill combines increased facility for retaining their prey, with augmented powers for seizing it. The plotuses or darters, another very remarkable genus of this curious tribe of birds have an excessive length of neck to fit them for pursuits differing from those of the pelicans, and the frigate birds; but the peculiar power of all is still the versatile gravitation of the body. The darter swims with the body surmerged, no other part being seen, but the long slender head and neck, which appear moving over the stream, like a serpent, breasting the waves, half erect. The frigate-bird's capacity is for the air alone; it abandons the water altogether, and neither dives nor swims, but confines itself to the limitless expanse of the ocean from whence alone it derives its food.

Of all sea birds, the frigate bird is one of the most remarkable. Its flight is not as distant from shore as that of the albatross, but it is equally of great duration, the bird having extraordinary length of wing in addition to the special organs for giving

buoyancy to the body. It does not like the albatross depend on its own unassisted exertions for food. It lives by rapine, and the prey which the gull and the sula seize, are yielded to the assaults of the frigate-bird to supply its wants and satiate its appetite. With all the means resulting from the best adapted form for flight found in the swallow tribe, on the gigantic scale of a bird of the largest dimensions, muscular power, lengthened wing, and a long and forked tail, it exhibits similar feebleness of feet. The same untiring flight and velocity of movement stamp both as dependent on the capture of prey, while that prey is moving through the air. Thus the frigate-bird darts upon the flying-fish, when they betake themselves to the air to escape their pursuers in the water; seizes the falling prey disgorged by the booby and the gull, when those birds are attacked and compelled to surrender it.

Let us go more minutely into the structure of the frigate-bird, to illustrate the versatile power of buoyancy in the pelicanidæ.

The capacious sack constituting the peculiar throat-pouch of the tachypetes does not form one uninterrupted chamber, but is intersected by some three septa or divisions, and seems a prodigious extension of the interclavicular or furcular air-cell.

Air blown into the trachea by the blow-pipe in a bird dissected by the late Dr. Chamberlaine, in my presence, did not affect this pouch; the communication appeared to be in some way from the mouth by the cervical air-cells. The dissection of this part of the bird had proceeded too far, for any decision

as to whether the communication was immediately by the eustachian tube, for although when the blow-pipe was introduced into this tube there was a sensible stream of air felt where the cervical air-cells had been opened, the throat-pouch having been likewise laid open, its dependence on a supply of air by the eustachian tube could not be ascertained.

While the numerous cells between the integument of the body derived their air immediately from the lungs, the throat pouch was susceptible of inflation totally independent of supplies from the thoracic cavity.

The air which had been blown into the lungs by the trachea had passed into the body generally, for when these parts were opened, they were found to be highly inflated and the vessels and nerves intersecting the transparent septa in their office of forming the cellular air-cavities, between the skin and the subjacent muscles, were beautifully exhibited in their passage, from the interior to the exterior portions of the body.

I observed, in the living bird that as the throat pouch, which is bare of feathers, was at any time distended with air, the skin increased in intensity of colour and changed from a dull dirty rouge, to a deep brilliant red, deepening in hue, as the pouch swelled in volume. This no doubt resulted from the change which the blood underwent, in the capillary vessels of this great receptacle. The systemic circulation in this part, was acted upon by the oxygenated air in the great cells of the throat, this air being derived immediately from the atmosphere,

independent of that which produced changes in the blood by the pulmonary circulation.

The throat did not form an open receptacle, hanging as a continuation of tegumentary covering of the under jaw like that in the pelican, but was a closed sack, having no perceptible communication with the mouth and was capable of being filled or discharged by a rapid collapse of the cells into which it was divided. This was doubtless effected by the large fan-shaped muscle that covers the inter-clavicular air cell, this pouch being, as I think, that cell prodigiously enlarged.

When the cormorant has swallowed a fish too large for the gullet, it has the power of inflating the throat and by violently shaking the head and twisting the neck, to force it through the passage. In the gannet the capacious œsophagus is similarly capable of being extended by inflation. The pelican superadds to the capacious œsophagus of the gannet the faucial bag. He regulates the distribution of air through his system, that he may carry his heavy load. The whole cellular tissue, even to the tips of the wings and the end of the fleshy part of the legs, can be blown up from the tracheæ. Air passes into the lower mandible immediately from the lungs by the cells passing along the neck and throat, and when he has swallowed any thing which he does not wish to retain, he has the power of blowing it out into his throat-sack, by a sudden blast, and, by shaking his head, to cast it from him.

A pelican I had sent me some days ago, wounded in the wing and unable to fly, accommodated him-

self to his crippled life with great sagacity. It was not possible to procure for him fish very early in an inland place like Spanish Town. He would wait with apparent patience up to what he considered a reasonable hour, that is, till noon-day, when he would seek me by searching for me wherever I might be found. It might be in the drawing room: then taking such a stand as would ensure attention, he would open his jaws, adjusting the under one in a straight line downward. Stretching out the sack, he would then give me to understand, as plain as a pocket turned inside out could say, "I have not a stiver," that he had nothing there, and hungry as a hunter without the power of hunting, he was ready for any provender I had to give him. It was interesting to see the readiness with which he transferred his instincts from the providence of nature to a secondary dependence on the providence of man. The bird I see tame on the beach at Port-Royal, exhibits extraordinary intelligence and docility, and resorts to the same mode of showing his empty sack to let his master know that he is as flat as a flounder.

I have a number of odds and ends of Fishermen's notes which I must string together and make the most of.

If a man takes to the sea for sport in Port royal, he is no half and half sportsman, he is "toties in qualibet parte." The night, or rather the turn of morning is the time for amusement, if one seeks for success as well as excitement.

The fishing for king-fish is on the bank on the outside of the Port Royal keys, where the maps set down the Maiden Key, the Long Key, and South Key. The outer portion is called the edge. It is far out to windward; so far away that you just barely discern the vegetation of the Palisades, when you are anchored on the bank. The current strikes upon it with a broad swell. The fishing time is over at day-break. It is accomplished with lines, wired for ten fathoms beyond the hook. When the fish has taken bait and is fastened, as he is large and powerful, one of the tuny alliances, the guarupuca of Margrave, the cybium Solandri of Authors,—he must be dealt with cautiously. There is a prodigious deal of unsatisfactory history in all these tassards, as the cybiums are called by the French. Nothing will be done conclusively till careful drawings are made of all our scomberoid fishes. I am disposed to give some of them an excellent name as table fishes. The king-fish is the most recommendable of them. Having hooked him, an instrument must be had recourse to, called the grabbet. It is a hook of large size, unbarbed. It is lashed on with wire to a staff, and placed under the fish when he is to be drawn up from the surface. He must be gathered in rushing from side to side as he plays on the water. The point is suddenly stricken into the body, and he is then jerked into the boat, and stunned by a blow from a block of wood they call the mutlar. The word is no doubt Spanish, and should mean the "killer."

The bonito is another of the tunny alliances. I do not know whether it is determined that this is the thynnus pelamys, or coretta. It is fished for on Fort shoal, just outside the point of Port Royal.—The shoal has from five to seven fathoms of water. The line used, is small and light. It is necessary that it should float, for the bonitos will only take bait at the surface. To induce them to rise, a handful of the trapong fry, is thrown into the water and on the bonito rising to this decoy, the baited hook with the gathered coil of line, which had all this while been held in the hand of the fisher, is suddenly thrown out among the fry, and the fish snaps it and is caught. He is a large and powerful fish, and requires to be helped in with the grabbet.

The bonito's visit to this bank is from August to April. In April they become scarce.

The great fishing place for sharks, is the bonito bank, off the Powder Magazine. At particular seasons the sharks abound there. These seasons are those of the sexual passion, and of fœtal maturation, when the viviparous shark like the viviparous viper must seek a bank to sun itself upon, that it may acquire a higher degree of heat than belongs to a cold-blooded animal. The sharks commence congregating on this bank in December. There is another shoal, called the Mammee shoal, off Fort Augusta, that is a common gathering place for sharks in the season.

Frequently as the shark is met with in the fathomless ocean, empty and hungry, ready to devour any thing that comes in his way, he is not a surface, but

a ground feeder. All the cartilaginous fishes are ground feeders. The flattened head, the transversal mouth, forming when open, a circumference, equal to one third the length of the fish as in the *plagiostome* division, or the truncated head and the suctorial mouth, without teeth, as in the *cyclostomes*, fit them only for taking their prey from banks, and shallows. Besides this, they all want the swimming bladder, so that they fall to the bottom of the water as soon as they cease to move in it. There is not so much mystery in the vast schools of sharks that are sometimes seen in places, as naturalists suppose. They congregate on the shoals for breeding. The saunterer on the shingled beach, however indifferent he may be to seaweeds, and such common products of the surf, scarce fails to be attracted by the semi-transparent, rolled-up sheets of something, having neither the appearance of horn nor parchment, though resembling both, which he hears called mermaids' purses. He takes it in his hand, or perhaps turns it over with his foot. He is puzzled by its strange box-like character, with convoluted tendrils at the corners. They are tangled with the seaweed. They were placed among the vegetation of the shore, to be fastened by those corner strings that they might not wash away into deep water. They are the egg-cases of cartilaginous fishes, deposited there to be hatched in the warm and sunny shallows. Anybody who has sent down the leaded line, armed with fish-hooks, when crossing the banks of Newfoundland, knows that he is just as likely to bring

up the dog-fish, the scyllium, or the mustelus, as the cod-fish or the holibut; and everybody who has stood upon our beaches, and seen the contents of the seine turned out from the shoaling bank, or the shallow shore, will call to mind the number of young of the raiadæ and the squalidæ, he has seen among the gathered hosts of the meshes. All these are so many evidences of the ground feeding life of the cartilaginous fishes. He will not be surprised to find therefore that the shark has its bank as a gathering place, as well as the usual market fishes. The two spots particularly pointed out as shark-feeding grounds at Port Royal are the Fort shoal, off the Magazine point, and the Mammee bank off Fort-Augusta. In particular seasons they are surprisingly numerous at both these places.

In a hole, as it is called, that is, a deep portion of the waters off Fort Augusta, is the fishing place for cutlass fish, trichiurus. The fishing is before day. The lines are pulled in as fast as they are thrown out, with the certainty that a cutlass has been hooked. As many as ninety odd boats have been counted on this fishing ground at day-break in the season, all carrying on this kind of uninterrupted hauling in of fish. The cutlass is a scomberoid fish, as flat as a sword-blade, and is delicious fried.

The shrimps, called grass shrimps, so necessary for bait, are caught on the shoals bordering the Palisades inside the harbour. The net used, seems to be what the French call the haveneau. It is folded between two poles and carried up by the fisherman

wading. When he comes athwart a body of shrimps scrambling through the water, he scoops with his net sufficiently deep to pass under them and so gets a shoal of them, which he transfers to a bag at his back or slung at his side.

The shrimps and prawns for the table usually seen in the Kingston market, are obtained from the shallows about Hunt's-bay.

The trapong leaps from the water as soon as it is hooked. If the line is held taught, he will succeed by his leaping manœuvres, in disengaging himself from the hook.

The anchovy engraulis (E. endetulus of Cuv. and Val.) abounds on the Palisade shallows. They are a most exquisite fry, cooked strung together on a palm straw through the eye, by half dozens, and served up as they serve white-bait.

King fish are only occasionally taken within the harbour. The king-fish mackerel that is the cybium regale, is taken at the head of the harbour by being gently towed for with a line.

The June-fish, plectropomæ - - - -, are frequently harpooned at the dock yard six feet long.

The mugil curema is taken about Port Royal and when large passed off in the market as callipeva, mugil liza.*

Having returned from a visit to the naval hospital, I call to mind an occurrence witnessed when I visited

* I am indebted to Mr Robert Salmon of Port Royal for the information contained in these notes on fishing.

it some fourteen years agone, from which I draw inferences that I would turn to account in a memorandum.

A young officer was in one of the centre wards convalescent from a fever. The pearly suffusion of returning health was lighting up his countenance, pale and sunken as it was. His disorder had rendered it necessary that his head should be shaved, and he sat propped in his chair in night-gown and night-cap, in the midst of that fresh airy enjoyment of the sea breeze, so especially a circumstance of the Port Royal hospital, and in which it has an advantage unequalled in any hospital beside that I have visited. By the invalid on his table sat a small sapajou monkey, with all the solemn interest of a friend in the concerns of the sick: he attended on the officer, smoothed the wrinkles of his table cloth, and waited for his spoon and basin. An interest seemed mingled in all the emotions of the master, with amusement in the officiousness of this kind and quality of a servant. He invited us to accept the caresses of his attendant monkey, assuring us he was gentle and we need not feel alarm at his familiarity.

Now it seemed to me that this kind of attraction of the sick-mind from the morbid sensations of loneliness and the regretful recollections of separation from home and friends, was an important aid to health. The attention was fixed on things, neither eye-sore, nor heart-sickening; and it strikes me that among such men as sailors, by whom shore allurements, are eagerly seized and intensely enjoyed, living objects suggesting the interest of natural history

might be rendered great auxiliaries of the hospital nurses and doctors. Poor good Sarah Adams was then there, moving through the wards in an atmosphere of endearment and regard for the motherly sympathies she united with her duties. Where there was grief there the habit of kindness in her, was ready to pour out consolation, and while it alleviated bodily affliction, to reconcile the heart with words of soothing, to suffering and sorrow as processes of purification to the soul. I would not say this, which might pass for mere sentimental talk, if this remarkable negress, were not still spoken of with absolute fondness by those who had experienced her worth as a nurse. With a creature like the sailor, who, with whatever of evil he may have, mingled with his nature, is distinguished for his generous virtues, the impulses that make him the hero amid the ardour of patriotism, are the burning zeal and devotion lighted at the hearth-fires of home. "The household fire and the altar," says the author of Lectures on the Philosophy of the Human Mind (Dr. Thos. Brown, lxxxix.) "which are coupled together in the exhortations of the leaders of armies, and in the hearts of those whom they address, have a relation more intimate than that of which they think, who combat for both. It is before the household fire that everything which is holy and worthy of the altar is formed. There arose the virtues that were the virtues of the child, before they were the virtues of the warrior or the statesman; and the mother who weeps with delight at the glory of her son, when a whole nation is exulting with her, rejoices over the same heroic forti-

tude, that at a period almost as delightful to her, in the little sacrifices which boyish generosity could make, had already often gladdened her heart, when she thought only of the gentle virtues before her, and was not aware of half the worth of that noble offering which she was speedily to make to her country and to the world."

Now a sailor, of all men sick and ashore, most feels that he is not at home, for almost always when on shore he is there. Whatever draws forth the confidence of affection among strangers, only impresses him the more with the consciousness that "he is not in his father's house," and brings upon him stronger yearnings for his early home. Port Royal, of all places, has the most desolate dreariness. You are on the land, but not of the land. You see the mountains but you are severed from them. You gaze upon the green uplands, but the link between you and them is a long sandy desert. I do not know what one of the medical officers at the hospital it was, but it was one, who drew the attention of government to the vast importance in a sanitary point of view to the sailor when sick and thoughtful on the probabilities of death, if he should be permitted to contemplate some more congenial resting-place than the burning sands of the beach. If he could see some shadow of a rock in that weary land, he might be reconciled to lie under it for rest and repose; but it was a tedious waste, unrefreshed by a single mass above its herbless sand-heaps of graves. The dreariness of such a prospect was a sad obstacle to that refreshment of the mind so

necessary to quicken the emotions of returning hope. It was easier to extinguish a fever than to mitigate despondency. The hospital officer suggested to the Admiralty that they should clear out from over-running wood, and bush and brier, the ancient burial ground at Greenwich, on the opposite side of the harbour ; representing the place as full of vaults and monumental memorials of the old seamen of the station, and that when opened out and set in order, with its heavy timbered trees and flowering shrubs, it would have the fairness and freshness of a garden. When Greenwich was an appendage of the Dock-yard, it was the free space for pastime and recreation with the Port Royal sailor, and, in the property yet existing in the burial ground, it might be made a strolling place for the sailor still. Sir Charles Adams told me he was commissioned to look at it and report upon it. I directed him to it and he visited it. It is there the victim of the memorable duel, Stackpole, lies buried, his antagonist Cecil, who survived him but a few days, finding a grave in the little corner garden that fills the cruciform spaces of Port Royal Church within the town.— I went and examined the Greenwich burial ground some years ago. There are several well-built vaults there. That erected by the Curtin and Dowdale family, stands about six feet high on a base of about nine or ten feet square. Two large marble slabs cover the top, recording the interment of many members of the family. The last recorded is 1752. Major Michael Brandreth of the Hon'ble Colonel Hay's Regiment has a large tomb. His

burial is of 1730. The slab is headed with the family arms. The crest, a lamb couchant. I noticed a head stone to the Halls of St. Andrew's, an inscription on a plate of copper of some naval personage, and a tomb of some official of the Dock-yard. There are numerous other memorials of the dead, but the place is so overgrown with wood, as well underwood as forest trees, that one makes his search of curiosity with a feeling conviction that if these tenants of the grave yard did not live contending with the thorns and thistles that the earth was to bring forth to every child of Adam, since the doom "dust thou art and unto dust shalt thou return," overtook them, they have not escaped the curse. —This burial ground is up, about a couple of bow-shots from the beach, "high and dry," commanding a pleasant view of the busy waters of the harbour, and of the mingled plains and mountains around.— No other burial ground in the district has the same aspect of a quiet resting-place, in the midst of a stirring world on sea and land, and so broadly and unobstructedly within sight of the great and terrible doings of human passion, the batteries on the shore fierce and tranquil, like sleeping watch-dogs; and the moving castles "whose march is on the mountain wave." It is a very appropriate berth for a dead sailor. I wish the government would reclaim it literally, as well in the legal as the agricultural sense. On the beach are the remains of a brick-built landing place. It is not so much cost of money as of time and labour that is required to set this house of the dead in order. It seems to have been established

in consequence of the earthquake driving so many into the Liguanea plain for a habitation. Greenbay was an additional grave-yard. There Louis Galdy lies buried, dead forty seven years after he had been buried alive in the earthquake, and disinterred again. But it is time to return to the Hospital.

So far then with reference to the prospect of death, but let us give some consideration to what may be made a salutary help, when that inequality in the condition of the body is overcome, which was disorder, and disease,—and health returns, and life regains its normal power, in becoming "the sum of the actions of an organised being;" when its tendency to replace what was lost and repair what was deranged, results in the ordinary operations of its original constitution. We know what the cheerful conversation of friends can do to keep the machinery of life steadily working when it has regained its balance. We know how the pleasant scenes of nature can force upon us in spite of our indifference, interest in the beauty of surrounding objects, and wonder and admiration at the instinctive intelligence which makes what is necessary to life and enjoyment subservient to both. When I had entered up thus much of my notes, I bethought me, I would turn to Thomson's little convenient work on domestic medicine, and household surgery to ascertain the notice which he has bestowed upon the *mind*, as one of the agencies of health. I found the influence it exercised over the sanitary condition, expressed as making the tone of it, a weighty consideration in the ultimate issue of disease, and illustrating it by a refer-

ence to "faith, home sickness, hope, fear," &c. as emotions to be attended to. I shall say nothing of hope or fear, the one as the exhilarating, the other as the depressing agent; and I shall make no reference to the faith of the doctor-book, which is not the faith that assents to the truth of what God has revealed, or puts the heart and the soul's dependence on trust in these truths for Salvation; that book makes it the "confidence in what medicine may do for recovery;" but the "home-sickness," the nostalgia, the emotion excited by things that recall to mind, whatever the heart has loved, making it the desire of the senses, and the craving of the soul; a vehement anxiety that must be controlled, or not alone melancholy will ensue, but disease will supervene. This is the subject on which I would dwell for a moment.*

* In the year '53 we were terribly smitten by yellow-fever; the visitation was confined to newly-arrived Europeans, and to vessels lying along shore. Out away in the harbour the crews were comparatively, if not absolutely safe. I was very much interested in a case related to me by a medical friend. A sailor youth some 14 or 15 years of age was mortally stricken with the pest. He was throwing up that black grumous matter, that told the blood had lost its vitality and death was circulating through all the system. "May I take anything I have a liking for," was the inquiry of the poor dying boy. It had come to this, that where nothing could do good, nothing could do harm. Assured that he might; he asked for a drink of milk. As it was given to him, and he drank it, "ah," said he, "this reminds me of my home,

It is the sick of the naval hospital we have to deal with. There are other wonders in the deep beside whales and walruses,—mermaids and sea-serpents. Familiar as the sailor is with his elements, the vegeto animal life of the ocean is an unopened book of marvels to him. Now what I would suggest as an amusement for the valetudinarian in this important institution, not alone to engross the mind pleasurably, and withdraw it from the morbid sensations of ill-health, but to keep it from brooding over friends and family far away, is an aquarium, or tank of rough rock work, grottoed at the ends, and so large that the eye might survey the objects within the water at a long angle, and see them fully and fairly. I would have it garnished with poriferous and polypiferous animals, actiniæ, corals, mollusca, and echino dermata, crustacea, and fishes, with all possible collections of sea weeds, algæ, and other

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and of my poor mother. I have never had milk from any one since I left her. I used daily to receive it from her hands." Then burying the recollection of his home in agony in his bosom, and remembering he was sick among strangers and without a mother's care, or a sister's comfort to soothe him, the emotion was too great for his enfeebled heart—he rolled himself upon his pillow and died.

"I have heard a voice that cries aloud—
Home, home, Comnenus!———
———————— Where hath he a home?
His home is with the dead!"

Isaac Comnenus, a Play, A. iii. S. iii.
by HENRY TAYLOR.

vegetable treasures of the deep. It would be supplied with fresh sea-water daily, and ensure success without dependence on the adjustment of those relations between the animal and the vegetable kingdoms by which the vital functions of both are permanently maintained, in places where sea-water cannot be had. These things have become quite systematised in marine establishments now. It is one of the pleasant pastimes of those who seek recreation and health by the sea-side, and who possess so much of a love of nature, as to notice these objects, to collect them in aquariums, and grouping them as we would do a posy of flowers, to watch their expansion into full bloom. It is not all animal flowers that are susceptible of being detached, but those that are, will repay the trouble and the watchfulness necessary to obtain this gratification. To gaze on them clustering the rocks, and spreading their brilliant tints in the sunshine, mingling purple and pink, blue and yellow, with fringes of green, varied with crenated and runcinated edges, like so many assembled plants in blowth, and yet vanishing into mere masses like colourless funguses, when an attempt is made to touch them surprises as well as amuses. These are objects by their unusual or more properly speaking uncommon character, when we refer them to terrestrial experience, that give a stimulus of pleasure unequalled by anything else to valetudinarian feelings, when the once-more-breathed air, and the refreshing earth and the sky inspire sensations of

intense delight. All the living objects of an aquarium would excite interest, but the animal sea-flowers would engross the mind with wonder. Outwardly to nature and inwardly to ourselves our thoughts are or ought to be ever with HIM "whose righteousness is like the great mountains, and whose judgments are a great deep;" but in the preservation of man and beast, the "fountain of life in whose light we see light," gives wonderful expansion to the outpourings of the mind, when we turn to objects that hold such an ambiguous relation among living organisms that we feel ourselves equally right whether we speak of them as plants or animals. Notwithstanding the designation of sea-weeds given to horny articulations, ramified into arborescent forms, immoveable on rocky bases, those branches and stems are animal products denuded of their cortical polypiniæ. Whether the caliciferous corallines of Lamouroux should be absolutely ranked with plants, so equivocal is their character, so uncertain, they are not considered to be rightly placed with corticiferous polyps. The actiniæ, the most showy of the animal sea-flowers, (expressly excluded from the class of polypi, though closely related to them,) are placed with them by Dr. Johnston, as radiated zoophytæ. Sponges are described by physiologists as dubiously admissible into the animal series, and the jointed and disjointed algæ, enumerated as true sea-weeds, are of habits so paradoxical that naturalists are far from agreed whether they are not minute animals,

living in society and dispersing when the necessity of multiplying their race obliges them to do so. All are agreed that these beings exist at a point in the organic kingdom of nature in which there is the greatest difficulty in seizing facts which could at once determine their position in the animal or vegetable scale. Definitions so easily employed higher up the scale are of no use here. Examining the zoocarpes we might say we saw "a provisional creation waiting to be organized and then, according to the corpuscles which penetrate it or develope among it, becoming the origin of two very distinct existences, the one animal, and the other purely vegetable." (See algæ : pseudozoaria : zoocarpes, glioiocladeæ :) These are the kind of attractions with which I would embellish the convalescents' aquarium.

The flight of the several birds that usually course about the Port Royal waters, is sufficiently distinctive. They can each be recognised at a distance.— The sailing of the gull-tribe ; the flight of the sterninæ, the terns and hydrochelidons ; the larinæ, xemas, and the gull proper or larus, is always well represented in marine pictures. They scud like vessels in a stiff breeze, cutting the wind in a slant, just as a skiff does sailing close hauled. The Osprey glides and hovers : the herons flap leisurely their pinions, curving their necks upon their breast and putting their frame in the least possible space. The pelican flies heavily as if he was always burthened with a load. The ducks winnow the air

laboriously, and the rails flutter for short distances only. None of the sea-birds clash their wings like the doves. The most self-commanding in its movements is the frigate-bird; he does not seem to stir a feather, but motionless to float through the air.—Whether he is high or low, he never changes the character of his movement, except to dash downward or upwards, to attack a gorged gull or a booby.

The vulture seen at all times, frequently courses along the beach to pick up the putrid refuse of the nets, and surpasses all birds in the character and quality of his flight. Without being more varied than that of the birds previously enumerated he has more of port or dignified bearing. Some five or six together will sail through the air as if they were wheeling through the mazes of a cotillion. The following description by Washington Irving is the most precisely graphic picture I know of its action in flying: "The turkey buzzard (vultur aura) when on the wing, is one of the most specious and imposing of birds. Its flight in the upper regions of the air, is really sublime, extending its immense wings, and wheeling slowly and majestically to and fro, seemingly without exerting a muscle or fluttering a feather, but moving by mere volition, and sailing on the bosom of the air, as a ship upon the ocean. Usurping the empyreal realm of the eagle, he assumes for a time the port and dignity of that majestic bird, and often is mistaken for him by ignorant crawlers upon earth. It is only when he descends from the clouds to pounce upon carrion

that he betrays his low propensities, and reveals his caitiff character." The frigate-pelican is the only one of the sea birds that at all rivals him in his majesty of movement, but his narrow angular wings do not impress an observer with the same sense of stateliness as the full capacious van of the vulture.

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On Bare-bush key, a low island with no vegetation above the height of the merest scrub, the crab-catchers, and little bittern, the ardeola exilis lay and hatch, and bring out their brood: but the great nursery for the herons is the salt-pond; in the mangroves that impenetrably line it on the sea-ward side, their nests are numerous. The blue gaulin, egretta cerulea, the egretta ruficollis, and other dark plumaged egrets, with the nycticorax make nests of slight wicker-work among the mangrove foliage, but the pretty green bittern, which we call the crab-catcher, the herodias virescens, and the diminutive ardeola exilis construct more elaborate nests, a cup of herbs and fibres bedded in a centre of interwoven sticks and slight twigs. The eggs of all the heron-tribe are of the colour they call aqua-marine, a mingled blue and green tint; the eggs of the several genera and species differing only in rotundity or elongation; or in the greater or less depth of the sea-green hue. All the pelicanidæ, the pelican proper, the booby and the frigate bird lay white eggs, and the sterninæ, and laridæ blotched and spotted eggs. The pelicanidæ make their nests on the rocks.

Isidore Bourden a French physiologist has well

remarked that the question of difference between animals and plants is not a question about what are the characters peculiar to either, but what are common to both. The elements of the structure of both are the same: they both commence in the simple primary cell, and an aggregation of these cells, forms the tissues, and makes up the completed organs.—We know very well that animals have nerves and muscles: that they possess in the higher grades, brain, and a heart, and lungs: and that they are furnished with a stomach and organs of support: that so constituted they move, digest, respire; that they have blood; and that they are endowed with more than irritability, a power which is unquestionably sensation. But what remains of all these characters when we descend the long chain formed by sensitive beings and examine them from the first, link to the last? Lungs, glands, brain, skeleton, heart, arteries, blood, nerves, and muscles, successively disappear, till at last when we look for the mechanism of the internal cavity for the absorption of food, which we consider the indispensable characteristic of an animal, we are not sure whether even a stomach is left.

We see ordinarily that animals are endued with sensation, and with perception. That they possess the faculty of transporting themselves from place to place; that they live upon organic substances which their powers of motion and their ability of perceiving, and discriminating, enable them to select; that their food passes through an alimentary cavity from which its nutritive properties are transfused by

means of absorbent vessels into the system. Then we see that plants, on the contrary, are destitute of all traces of a nervous system, and consequently of perception as well as sensation; that they are fixed to a particular spot whence nothing but mechanical power can remove them; that they have no property, which we call motion, but that which they derive from internal, vital, and mechanical agency; that they subsist upon the inorganic matter that surrounds them, the earths, gases, and fluids; and that their food is at once introduced into their system by absorption through their external surfaces only; by the action of the leaves on the air, and the roots on the earths, and the fluids imbibed in the shape of rain, and dew taken in through all their surfaces.—We hence see that among the distinctions between the animal and vegetable kingdoms, that which is of first consideration is the different means possessed by sensitive and insensitive beings, animals, and plants, of procuring food and imbibing nourishment.

Animals gifted with power of movement, with feeling, and perception, distinguish and select what is proper for their sustenance. Furnished with organs of mastication, they reduce to minute pieces the substances on which they feed, and having absorbed as much of them as may be requisite for sustentation they reject the rest through channels provided for the purpose. Plants rooted to the same spot, have no power to go in search of aliment; their juices flow through their cells and tubes, with a regulated motion, and assimilation and reproduc-

tion indicate their growth and powers of continuance : they have no capability of distinguishing between the hurtful and the wholesome ; and if unprovided with a supply of materials for imbibition and absorption, they must perish. As nothing but matter so delicate as to pass through perforations, which the human senses, aided by the most powerful microscopes cannot distinguish, is fitted for the support of plants ; and no inorganic matter, but water or air, or substances held in solution by the two fluids the aëriform and the aqueous can answer this description, air and water become the essential elements for the support of vegetable life.

When we advance from the living bodies which we recognise as absolutely vegetable, to those which we perceive to be absolutely animal, by the intermediate links that unite both, we find a difficulty in applying the distinctions we have just insisted upon to the higher endowments in the lower ranges of organic life, and to the lower endowments in the higher. We find that the character we have assigned, will not apply with exactness to either the animal or the vegetable kingdom. Let us take up the genera *Diatoma* or *Fragillaria*, and set these by the side of some tribe of aggregated *Ascidians* such for instance as the *Botryllus*. The individuals of this tribe which at a certain period of their existence unite to form one common mass or system, float separate and free at first ; and the disjointed algæ, diatoma and fragillaria, living in society and dispersing to multiply, shake our confidence in spontaneous motion from place to place as a test of animal

or vegetable nature. The transparent joints of the *zygnema* are filled with a green reproductive matter composed of brilliant *sporules* arranged with beautiful symmetry in spires, but when they become separated, or in the scientific phrase *disarticulated*, their separate parts have distinct powers of voluntary motion : they unite and disunite, and finally combine into a simple and uniform being. We find properties here which would justify us in viewing them as a link between the animal and vegetable kingdoms, and endowed with the character of both. We take another example and ask in which kingdom are we to station the curious *poly physa*, a most decided polyp according to one set of naturalists, among whom we name De Blainville ; an equally certain plant, if we are to trust another set, among whom occur the names of Agardh, and Gaudichaud, the last of whom found it and described it. " It grows in thick tufts to the shells which are thrown ashore upon the barren coasts of New Holland. Each individual consists of a fistula, capillary, greenish stalk about an inch or an inch and a half long, expanding at the base into a sort of root-like claw, by which it is fixed. At the end, it bears from fifteen to eighteen sacs, which are entire, rounded at the end, and slightly attenuated at the base ; each contains a multitude of little round green globules, which finally expand and break through the thin case in which they are included. They are filled with a green unctuous matter, and the colour of the parent body is entirely due to their presence, for when they have all escaped from their sacs, the mother body is perfectly colourless."

From the earliest times in which we find researches into the systems of nature, we discover difficulties in tracing the separation subsisting between the animal and vegetable kingdoms: obscurity envelopes the subject. We find irritability in the vegetable, and we seek and find something like the faculty of self-government: we see sensibility in the lowest grade of animal life, but in tracing its functions, find them so equivocally manifested that the subsisting sensibility, amounts almost to an unrecognizable condition of the will. The mode by which systematists sought to meet a difficulty which patient observation had failed to unravel, has been by constituting an intermediate order of life, so vaguely characterized to embrace the doubtful conterminous tribes of animals and plants. To these they have applied the terms of *phytozoa* and *zoophyta*, plant animals and animal plants, as the one or other nature seemed most predominant to shew their approximation to vegetables or animals; while the designation of *lithophyta*, *ceratophyta* and *calciphyta*, in expressing the horny or cretaceous nature of the animal or vegetable structure suggested, also their analogy to mineral aggregations. In the term PSEUDOZOARIA proposed by De Blainville, to include all the equivocal living forms, in which it becomes absolutely a matter of indifference, whether we make them animals or vegetables, since they fall within the definitions employed to characterize both, we have groups of the corallines and conferva at one extremity containing fibrous and cretaceous bodies, curiously articulated, and branching into radiated tufts,

and at another, series of ramifications ending in soft buds or filamentous gelatinous bodies, plant-like agglomerations of animals originally free and individualized, but finally associated by junction.—When we advance a step further, we ascend to those gradations of animal life, which assume the form of plants distributing their extravascular coverings into branches with tufts of animal flowers, and in this way becoming associated and united one with another. This next series of life is the *polypiaria.*

The active animals of the polypiaria of Blainville are generally of slender figure, provided with thread shaped tentacular, or ciliæ, some are provided with horny operculums for closing their cells ; others are spread out into convoluted expansions, or are dilated into leaves, or are articulated and arranged in a network of chains.

Of those which especially command attention for their flower-like beauty, we may cursorily notice the *campanularia,* the *sertularia,* and the *plumatella.*—The ciliated circles rising out of cup-like cells from a twisted axis, and the plume shaped tentacula attached by radical fibres on a horny stem, and fasciculi or bunches of tentacular fringes, retractile and closing up, like sleepy blossoms at sundown, are some of the most remarkable as well as beautiful of these animalized masses in the form of plants.

It has been remarked that "as in a tree the flowering and reproductive organs manifest more active and varied functions than the general mass of bark and wood which serves to unite them in one

common life, so in these zoophytes the little polypi, expanding from their cells for food, light, or aëration, and shrinking back upon the agitation of the water, or withdrawal of the light, are so many animal-flowers which may be studied apart from the polypiaria or permanent branches which they adorned." (v.: Penny Cyclopædia, commenting on Trembley's Descriptions: Art: Polypi.) Without organs of sense, or provision for mutual offices, they are associated into compound beings, and multiply by the process understood as gemmiparous, by the separation of buds like a tree.

The *actiniæ*, not so associated though closely allied to the polypes, making near approach to the higher group of tunicate mollusca, will arrest notice for a moment or two. These animal sea-flowers, more particularly bearing the names of anemones, mesembryanthemums, pinks, auriculas, daisies, sun-flowers, and marigolds, are cylindrical bodies, fleshy and soft, susceptible of contraction and dilatation. As their tentacula can be folded down into the centre aperture, and concealed under the outer envelope, when they are extended they have the appearance of opened blossoms, their floral character being increased by the lively colours, with which they are embellished. On the shores of temperate seas, in waters sustaining the varying warmth and cold of summer and winter, they exhibit the remarkable instinctive power of creeping up to the superficial ocean in summer, and of descending to the profounder waters in winter. To effect these changes of place, they have

the power of turning themselves inside out, and of making use of their tentacula as feet with which they creep along the ground, and on finding a convenient place, of attaching themselves there firmly. (See *zoantharia*.)

There are a number of beautiful children running about the garrison grounds at Port Royal. They look the picture of health and lustiness. They do not suggest to the eye, the enervating influence of an Indian climate. They amuse themselves in the evening, filling bottles with the small shells they find on the beach. Port Royal does not however present more than two shells worth looking after, the pearly *turbo pica*, that they sometimes clean and sell in the streets, and the *spirula* a chambered cephalapod, never found perfect. The fragmentary spirulæ on the beach are worth looking at attentively, for the long discussion which De Blainville has excited on the structure of the animal, in his *Malacozaires*. The cephalic mass that filled the outer cup of pearl, with the appendage that traversed the numerous empty chambers from one to the other into which it passed, is always torn away. I have never met with any body who has found the recent animal with the shell. A tubiform prolongation runs from the first chamber to the last, an extension no doubt of the columellar or retractor muscle. A person who has seen a shell of the pearly nautilus pompilius cannot doubt that the organization of spirula must be perfectly similar. The animal would be discovered if those who had

opportunities of searching the keys outside at all times, and under all circumstances of weather, would make themselves acquainted with the fact, that, when the shell is enveloped with the fleshy mantle, and its fragility renders it necessary that it should be so enveloped always when moving about, it looks like a mass of blubber. No one would suspect that the beautiful shell of the cypræa was to be found in the lump of shapeless gelatine that lies about on the low keys. The cover of the spirula has a similar unsightly look. We are as ill informed nearly about the pearly nautilus, as about this cephalapod of ours. Our information on the former is nearly all confined to the following fact in Bennett's "*Wanderings.*" 'A mate of a whaler who had been shipwrecked among the Fidgi group of islands in the Southern Pacific, and had resided among the group for nearly three years, told Mr Bennett, that he had seen the shell of the pearly nautilus containing the living animal, floating in the water near one of the islands. He had only seen two living, although the empty shells were very numerous among the islands. The first time he saw one, was when in a canoe with some other shipwrecked Europeans; it was then floating upon the surface of the water with the mouth of the shell uppermost. It was enveloped in the mantle, which extended some distance upwards, and over the whole of the shell; and it had such an appearance as to cause one of the men in the canoe to say;—'There is a large piece of blubber upon the water; on approaching it, the ani-

mal retracting the mantle, displayed the beautiful stripped shell and sank before they could capture it.' (Appendix, vol. ii. p. 410.)

When I was a lad at a grammar-school in the north of England a young friend who had that pleasant activity of mind which fitted him for everything that was smart, expert, and tasteful, amused the town with cleverly describing the effect produced on its jog-trot business people, by the coming of fox-hounds into the neighbourhood. He depicted the sudden frenzy for the hunt on all sorts and descriptions of people. His father's boatmen had quitted their barges and taken the barge horses to the field. The urchins of the parish clerk had had sufficient influence with the vicar to get the loan of his ponies: everybody had taken everything to join the pack and my friend's well known trotter an incomparable roadster, which had been sent to the smithy to be shod all round, was too irresistible a temptation to the Farrier, and he and the trotter when inquired after, were both accounted for, by the universal answer to all questions for everybody, "gone a-hunting, sir."

"Most men,' says White of Selborne, 'are sportsmen by constitution, and there is such an inherent spirit for hunting in human nature, as scarce any inhibitions can restrain." The occurrence that stirs into activity such a hum-drum place as Port Royal, is the intelligence that some of the naval, or some of the artillery officers are off for a day's sport with the

devil-fish. Every available vessel is in requisition," canoes are launched, and glide rapidly to the spot where it is announced that the harpoon has been successfully struck. A string of boats will be seen towed to sea for miles away before the monster is brought in; and when he comes in, it would take a team of oxen to drag him ashore, if such a thing as a team of oxen had been ever to be found in Port Royal. I am informed that the artillery officers have been successful in the chase and capture of two of these colossal rays lately. Nothing particular has been related to me of their adventures, but if a naturalist would realize the excitement of these occurrences here, he will find a graphic narrative of the taking of two devil-fishes related by Lieutenant Lamont of the 91st regiment, in the 11th volume of the Edinburgh Philosophical Journal.

The Lieutenant had been called to the beach by some one to join an assembled multitude in looking at a sea-devil. His curiosity and surprise, were not less excited than theirs when he saw floating close on the surface about twenty yards away from him, a large living dark coloured mass, whose shape and size were not immediately to be determined, but which looked prodigiously big, exceeding all that he had seen or heard of fishes. It was pursued and harpooned, and no sooner had the weapon struck, than the monster made off with great velocity, towing the boat of the harpooner after him. A succession of boats came up, and these stringing themselves one to another as they consecutively struck him, formed a long line, but such was the great

strength of the animal, that in the course of four hours it had towed the retinue ten miles out to sea. Night was drawing on, and to bring the chase to a close another harpoon was struck, when the devil darting off, by one convulsive effort, broke loose from all fetters and carried away eight or ten harpoons and pikes, leaving every one staring in astonishment at an animal, that could thus snatch himself from the power of his pursuers.

Lieutenant Lamont gives another detailed account of the take of a Devil-fish more within the harbour, when the animal traversed up and down with the boats after him, towing the first boat whose harpoon took effect with such velocity, that those in company could not overtake it. The struggle this monster made to get away was tremendous ; plunging in the midst of the boats ; darting from the bottom to the surface alternately ; dashing the water and foam on every side, and rolling round and round to extricate himself from the pole. Unable to effect his escape by these expedients, he set to, towing all the string of boats after him, a feat he performed with the greatest ease. He then suddenly brought the retinue to a stop by laying himself at the bottom of the water, from which the stretch and strain of all the boats could not move him. Enticed inch by inch to the surface by slackening the tension of the united fleet, he was finally brought up again, when a general assault of pikes and muskets was made on him. Literally riddled through with wounds, he floated clean up, not as yet quite dead. Until this capture was effected by Lieutenant St. John of the

artillery, it had been supposed that a sea-devil was beyond the main and might of human seizure — The dimensions of this last fish was only fifteen feet the depth of the body being from three to four feet, having a mouth two feet and a half wide, into which a man entered with ease. This is at least ten feet less than the measurement of some of them. The largest that ever came under my own eyes, was when I was on board a vessel of Bourdeaux on my way from Haiti to France We had just cleared the last of the Bahamas, and as we gently scudded onward with the wind on our beam, we sailed close along one of these cephalopteras leisurely flapping and floundering on the surface of the broken waters, striking first one fin into the air and then the other, and presenting a bulk of living flesh, half the dimensions of the vessel. A specimen of this fish from our inter-tropical seas figured and sent to Lacepede, was nearly twenty feet in size. It is this species that Barrère and other travellers have spoken of, of uncommon dimensions, seen springing above the surface of the waters and splashing them to an immense height when falling into the sea again. It is these fishes that Le Vaillant saw in his second voyage to Africa, the smallest of them having been caught was found to be twenty five feet long and some thirty wide ; and it is this fish that Sonnini speaks of when he represents a flat fish, seen on the surface larger and wider than the ship he was sailing in.

Risso gives a very interesting trait of character, in two of these monsters. In the month of Sept.

1807, they took in a net they call a mandrague at Nice, a female cephaloptera, the vacca of the Mediterranean fishermen. It weighed 1,328 pounds avoirdupois. Sometime after they captured the male, which weighed but 885 pounds. The first taken fish, the female, was thrown into the boat lowing piteously, the tail having been thrust into the gills. The male ceaselessly haunted the spot for two days. From time to time it wandered round and round the nets, searching for its lost mate where it had disappeared, and was finally caught in the mandrague that had taken its companion, but quite dead.

The mandrague, the net here spoken of is peculiar to the French Mediterranean coast. It is long and complicated ; and divided into chambers. It is stretched out with anchors, and gathered in by several boats together. There is something amusingly touching in this picture of the loves of sea-devils ; the moaning captive and the love be-gone wanderer seeking his lost one. The lover finds no solace but in dying in the toils in which the dear object of his affections had perished. The old feeding ground ceases to be pleasant. What a difference between love and every other desire. " Dinner is taken away as soon as over and we regret it not. It returns again with the return of appetite. The beef of to-morrow will succeed the mutton of to-day, as the mutton of to-day succeeded the veal of yesterday. But when once the heart has been occupied by a beloved object, in vain would we attempt to supply the charm by another. How easily

are our desires transferred from dish to dish. Love only, dear delusive, delightful love, restrains our wandering appetites, and confines them to a particular gratification." I think here the burlesque of the "*Rovers or the double Arrangement*," has supplied me with an admirable illustration of love at the bottom of the sea, among the seductive allurements of soles, turbot, and oysters, sardines, anchovies, and sturgeon.

This is one phase of appetite among sea devils; we shall present another of mere mischief and deviltry. Colonel Hamilton Smith once witnessed the destruction of a soldier by a cephaloptera off Trinidad. The soldier, a good swimmer, was attempting to desert from the ship then at anchor in the entrance of the Boca. It was just after daylight, and the man being called to by a sailor in the main-cross-trees, endeavoured to return to the vessel, when at the moment a devil fish just threw one of his fins over him and carried him down. This was not for the gratification of appetite; it was for pure mischief and frolic that he bore down the swimming soldier.

The sea-devils luxuriate much upon the surface, and though they have never been observed so frolicsome as their congeners the sting-rays,—the trygons, who frequently spring out of the water, and pitch themselves to a distance like quoits, yet they are fond of sauntering about, flapping first one wing-like fin and then the other in the sunny fluid. In an early morning sail from Passage Fort to Kingston, among the stretch of shoals between Fort Augusta

and Hunt's Bay their favourite feeding ground, I passed three of these monsters swimming on the surface. They were spread out, in the midst of the dotted mangroves like lotus leaves upon a pond. It is about the sands here, you will find the nurse-shark scyllium ciliate basking by hundreds in the month of July: and at all times the gar-fish in the glance of the rising sun, amusing itself by leaping from left to right and right to left over every stick that floats in its way. Every now and then one or other kind of fish will make a clean breaching of some dozen or fifteen feet up into the air. Here we may meet with our cetaceous dolphins rolling and tumbling. Fishes are very frolicsome. I confess that when I see their sportiveness, the evidence of their exuberant enjoyment of life; their swimming hither and thither, sometimes few and sometimes many together; swift or slow, gentle or rapid, just as they please, the element seems to be to have in it that especial pleasureableness which is exhibited by a parcel of boys in a morning bathe. Water has a comfort of feeling exceedingly appreciable to our own sensibilities, and, I think, above all, sea-water.

The lips of the sea-devil are a pavement of ivory rough and rugged as a file. Their fins spread out into a point, like the wings of a bird. They have flexible cartilaginous horns to their head, making a kind of inward roll upon one another. With these they scoop their food into their capacious mouths. One cannot contemplate this platitude of fish without wishing to see in such a giant the removed skin, with the numerous phalanges divided into several

pieces; and the belted neck supporting the anterior extremities, and the carpal bones; and the vertebræ sustaining the pelvic apparatus; and all that curious circling in of the cranium, which makes it all head and wings, and obtains for it the name of cephalotera. The sunning out of the great living mass by swimming at the surface is to obtain the necessary degree of warmth for the maturation of the fœtus. Their sexual companionship results from their impregnating in coitu, and bringing forth an ovo-viviparous offspring.*

The animal of spirula is one of the desiderata of natural history. If one would appreciate duly the extent to which the subject affects scientific intelligence, he has only to consult Dr. Buckland's Bridgewater Treatise on Geology, ch. xv. sect. vi—where he tells us that from Peron's discovery of the shell of a spirula partially enclosed within the body of a sepia, we ascertain the nature and organization of the extinct ammonites of the earliest transition strata, down to those of the most recent secondary formations. The interior of the ammonites was divided into numerous chambers by transverse plates, pierced

* On the 4th May: a devil fish was taken in the harbour of Montego Bay. It is a very unusual place for a fish of the habits we have mentioned, there being no bank there to accommodate them when breeding. I suspect, however, on the opposite coast of Cuba in the shoals of the Jardinas keys, they are common, and the one taken in this North-side harbour, had been driven over in the late boisterous weather. I understand another was seen at the same time.

by a siphuncle near the dorsal margin. This any one will perceive is the character of the spirula of the Port Royal beach.

But to return to the children picking shells.—How pleasant it is to see their bold gambols on the beach within the beat of the blustering surge. It is in the evening one mostly meets them. The morning is the hour of the land-breeze. The constant ocean wind by midday would be enticing, if there were any embowered shadows on the shore to rest in and enjoy it. We hear the nurses singing to their young charges in the pleasant blandness of the breeze at noontide, not on the beach, but within the long piazzas of the buildings overlooking the waters. I hardly know what appropriate songs they have to chime in with the wind's lullaby, but I will give them one which they may find a tune to, if they will.

THE CREOLE NURSE'S SONG TO THE SEA-BREEZE.

Flutteringly, faintly, just up from the ocean,
Freshly and fragrantly over the lea,
The sea-breeze is coming, I see its light motion,
A-stirring the leaves of the cocoa-nut tree.
It comes and brings gladness to me and my baby;
It comes and brings health to my baby and me;
And fresh as a rose will the sun-light of day be,
Since stirring and up is the breeze from the sea.

Look, see, how the light on the waters is dancing,
Look, see, how the ripples run racing away;
How whiter and whiter the waves are advancing,
And sinking and rising like lambkins at play:
And hark at the breakers, but loud as they may be,

They sound like sweet music far over the sea
They sound like sweet music to me and my baby,
For health they bring both to my *baby* and *me*.

The sky is chalky, thick with gathering vapour, for the sun is rising to the zenith, and the mountains loom hazy and dull. The sea-breezes come tardily, but linger till some time after sundown. It is pleasant to be on the beach with the slant beams at your back, and to look eastward on the surging waters breaking on the sands. The land is so intermingled with the clouds, that you cannot tell the beginning or the ending of earth and air. It is not easy to describe the appearance of the scenery. It is difficult to paint it; yet I have seen some of Martin's wild and vast representations of vales and interminable mountains, and measureless gatherings of vapour, which have been a vivid realization of these objects. The mountains rising through the obscurity in darkened patches, present here and there a peak above the clouds, but have trails of rolling and changing mists, rushing up them. Although you see no definite line of vapour downwards, you have distinct enough, the lights and shadows of the vast accumulations upwards. Onward with steady force rushes the wind, and the sea with its green islets and white beaches, and its breakers on the lines of near reefs, and the heaving curve of billows on the shore, comes with its heavy and measured reverberations awfully.

Applying to the sunset, the half light, half obscure character that Milton gives to sunrise, when an

eclipse is coming on, would paint now the struggling rays through the thickened atmosphere. The descending mass of radiance which rather shews where light is, than what it is, looks shorn of its beams, through the horizontal misty air, and brings on twilight. The bordering plain between the seabord and inland range of mountains fades into nothing, and the broad sky overhead, is shot over by straight lines of dark and faint tints, that touch from the western to the eastern horizon. The breeze is still blustering ; it scarcely relaxes in force, but by the time it is dark and the stars are out, the vapours have dispersed, and the night is pretty clear and calm, and the southern cross very conspicuous.

The new light-house shines like a meteor in the east. The shore, though a mere sand bank forming what is called the palisades, slips at two yards off into ten fathoms of water. There are no protruding rocks : the danger in the long canal-like entrance from the light house to the harbour, is in the islets and shoals outward, marked by great floating beacons, that give an awful announcement of danger in their ceaseless turmoil, and movement up and down, looking like sea serpents swimming into harbour. The big black and white buoy near the point, is a vivid picture of Commodore MacQuhae's encounter with the solitary living creature passing the Dædalus. By the assistance of the light house, ships now safely enter Port Royal after night-fall. Many a time the rocket of the approaching steamer startles the eye, as the first intimation that the packet is coming in. A ship no longer now approaches the shore

"As one who, wandering in the starless night,
Feels momently, the jar, of unseen waves,
And hears the thunder of an unknown sea,
Breaking along an unimagin'd shore."

All is as safe and straight into harbour as a turnpike road.

The week's indulgence from home is at end; we return up to Kingston. The morning aspect of the mountains, and the air coming from them over the waters, are very different from the scenery and sensation of the sea, as the breeze lulls to slumber at sunset. The day is very little more than up.—The gray mountain masses show some three or four gradations of depth, barely looking "misty and wide." The peaks do not wake up in night caps: they are not kerchiefed in clouds. The *Long-mountain*, beneath the triple pointed crests of the far off heights, specially distinguished as the *Blue mountains*, fills the foreground dark and crouching, and reminds one of the Sphinx at the foot of the Pyramids. The dwellings of the city rise with a border of ascending smoke trailing out seaward.—The ships lie out in the calm, looming large and hazy. The fluttering waters just ripple by the boat, with the sails barely bulging to the air. It is a quiet journey, with some three or four other boats taking the land breeze with us. We slip by the mangroves with scarce a leaf more than just winking. A couple of pelicans flap past us: a flock of wild ducks winnow high over head: a gull screams as he flies by lazily; a heron or two, like snow flakes, float

away at a distance over the marshes. There is no sound of the morning dove, though he is so often heard here tootling out, his song of "sailor's coat's true blue." The moving smoke through the morass is the train speeding on the railway, and there it is that the white egrets are on the wing. The glancing sunlight tips the salient mountains. We have reached the Wherry-wharf, and are in Kingston again.

But what good has the change done me? A great deal. "Le plus lent à promettre est toujours, le plus fidele à tenir," says Rousseau. The sea-breeze is not, however, slow in promising to the invalid, and he keeps his word. As long as he made music for me, my blood circulated with renovating power. Afternoon clouds brought scudding rain along the mountains, and the wind from the sea died away suddenly, and a squally chill blowing from the land, would make me cough again. The ocean air was always soothing; the ocean voice had always a sound of consolation. Its good work was done by degrees, and like work so done it promised to be successful; but for a cure I have come away too soon. *Friday*, 27*th April*, 1855.

APPENDIX.

——— **** While the papers, entitled "a Week at Port Royal," were passing through the press, Mr John Murphy, one of the Surgeons of the Naval Hospital, kindly sent me the skin of a large petrel, taken at the Plumb-point Light-house. Being a new and undescribed species of procellaria, he had deemed it would form an interesting addition to the notes I was giving to the public. It is not among the ascertained birds in Mr Gosse's Ornithology of Jamaica, but is referred to by him in communications from myself and Mr Andrew Gregory Johnston. I shall best state what is or has been ascertained respecting this undescribed member of the petrel family by extracting the note I sent to Mr Murphy on receiving his specimen.

"The bird sent to me is one of the larger petrels (procillariadæ) inhabiting the Cliffs of the Blue Mountains. The procillariadæ have diomedea, the albatross, at one extremity and thalassidroma, Mother Carey's chickens, at the other. Although the burrowing of our birds in the Blue Mountain Cliffs was particularly noticed by me in my communication to Mr Gosse as something special, it is the habit of all the petrel-tribe, except the albatrosses. *They* erect a structure of clay and vegetable remains, of some height, but all the others from the fulmar's and shearwaters downward (fulmarus and puffinus,) breed in burrows, more or less associated, remaining

there concealed during the day, and coming forth to feed at twilight. The rushing of the bird obtained, on the light at Plumb-point, would not have been remarkable had it been a duck, a plover, or a sand-piper, for it is known that when those birds make their migratory approaches to shore, they will dash themselves against the lights to which they steer when making the land at night, but the same head-long instinct surprises me in this petrel. If it were habitual in this class of birds, we should have heard of flocks of Mother Carey's chickens, rushing in at cabin windows, attracted like nocturnal moths to candles;—but I know of no such incident. I take our sizeable petrel to be the diablotin of the Windward Islands, described by Attwood in his Dominica, though he speaks of white in the *under* plumage, it occurs in our bird in the *upper*, and of the whole appearance being singular. This is his description.—"The diablotin feeds on fish, flying in great flocks to the sea-side at night-time, with hideous screams like the owl, which it resembles in its dislike to day light. The nests are made in holes in the mountains, and the flesh is considered a delicacy, particularly when salted." "To the questionable taste here noticed, I would add, that it may be *then* taken as a sort of cod's liver for its oil, when dressed, as Soyer recommends, the genuine liver to be."

From the dimensions of our bird, 13 inches long, by some 26 inches in the extent of wing, and from the proportions and character of the bill and nasal tubes, and the grooved mandible, I should say the *Blue Mountain petrel*, must be classed with the

prion of Lacepede, the genus pachytila of Illigar, the type being the *procellaria vittata* and *cærulea* of Gmelin.

Our bird has a triple row of palatal teeth, which I do not find to be a peculiarity set down of petrels generally, though I suspect it is so. The prions, however, like the diomedeas are birds of the Southern Hemisphere. Mr Gould, the distinguished ornithologist thus notices them. From the westerly winds, which prevail in the Southern Hemisphere, between the latitudes 35° and 55°, I am induced to believe that a perpetual migration is carried on by several members of the oceanic family, continually passing from west to east, and circumnavigating this portion of the globe. This remark more particularly refers to the albatrosses, prions, and other large kind of petrels; the same individuals of several of these species having been observed to follow our ship for some thousand of miles. Until I had ascertained that they were nocturnal, it was a matter of surprise to me how the birds which were seen around the vessel at night fall were to be observed crossing our wake at day-break on the following morning, the ship having frequently run a distance of nearly one hundred miles during the night." (*Zool. proc.* 1839.)

ADDENDUM.

I spent a day with Dr. Schmarda. To a person primed with general knowledge in Marine Zoology, the extent and value of his labours are seen at a glance. Since Broussonnett's visit to the island, we have had no naturalist who has done so much, or who has done what he has accomplished so effectually, in the oceanic department, as Dr. Schmarda. I would not undervalue Dr. Bancroft's collection, or Dr. Parnell's, both important acquisitions to the British Museum; nor Mr. Gosse's delightful memoranda in his "Naturalist's Sojourn in Jamaica"—But besides fishes, Dr. Schmarda has attended to the *infusoria*, the *radiata*, *mollusca*, and *crustacea*, and greatly enlarged our acquaintance with the most numerous, and most varied objects of marine life. His glass cylinders of about the length and breadth of a spermaceti candle, are exceedingly convenient and effective deposits for specimens. A paper marked with the object deposited, shoved in between the several specimens, separates each from each, and enables one, in the colourless glass and liquid to inspect them all round. Drawings could be made without removing the animal, and descriptions noted without handling the specimens.

In the facilities of transport, which the ocean waters afford, Dr. Schmarda finds the living creatures in the lower grades of organic life not alone

very similar in all the seas, but in numerous instances identically the same. The Atlantic corresponds marvellously with the Mediterranean, and the Indian and Pacific Ocean, have very universally the same genera with the Atlantic. He finds a community of infusorial life between the Arctic and Equatorial regions. Besides the equable temperature in which they exist, and in which they move, subject to a general diffusion from the whole region of waters being traversed by great streams and currents, which are so many ocean rivers,—much of the universality is due to the phenomena of geology, as Humboldt has shewn. "Previous to the existence of the human race, the action of the interior of the globe upon the solid crust which was increasing in volume, must have modified the temperature of the atmosphere, and rendered the whole surface capable of giving birth to those productions which ought to be considered as *tropical*, since by the effect of the radiation and refrigeration of the exterior the relation of the earth to a central body, the sun, began almost exclusively to determine the diversity of geographical latitudes."

In the infusorial department, under a heading,—"JAMAICA," Dr. Schmarda has made numerous drawings of objects determined under the Microscope. The drawings are magnified somewhere about fifty fold.

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